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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT
ADDENDUM /IM COMPLETION REPORT/ CORRECTIVE MEASURES STUDY WORK PLAN
SOLID WASTE MANAGEMENT UNIT 5 AND 18 AND AREA OF CONCERN 605 AND 621
ZONE E CNC CHARLESTON SC
5/9/2003
CH2M HILL

RFI REPORT ADDENDUM

RFI Report Addendum/IM Completion Report/CMS Work Plan
SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E



***Charleston Naval Complex
North Charleston, South Carolina***

SUBMITTED TO
***U.S. Navy Southern Division
Naval Facilities Engineering Command***

CH2M-Jones

May 2003

*Revision 0
Contract N62467-99-C-0960*



CH2MHILL

CH2M HILL

115 Perimeter Center Place, NE

Suite 700

Atlanta, GA 30346-1278

Tel 770.604.9095

Fax 770.604.9282

May 9, 2003

Mr. David Scaturo
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum/IM Completion Report/CMS Work Plan (Revision 0) –
SWMUs 5 and 18, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum/IM Completion Report/CMS Work Plan (Revision 0) for SWMUs 5 and 18 in Zone E of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me at 352/335-5877, extension 2280, if you have any questions or comments.

Sincerely,

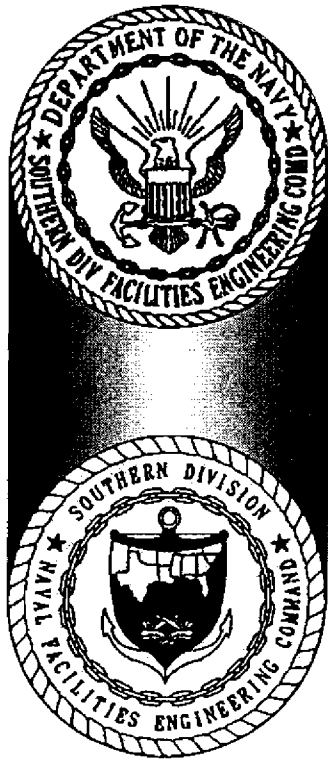
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Dean Williamson, P.E.

cc: Dann Spariosu/USEPA, w/att
Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

RFI REPORT ADDENDUM

**RFI Report Addendum/IM Completion Report/
CMS Work Plan - SWMU 5, SWMU 18, AOC 605,
and AOC 621, Zone E**



***Charleston Naval Complex
North Charleston, South Carolina***

SUBMITTED TO
***U.S. Navy Southern Division
Naval Facilities Engineering Command***

PREPARED BY
CH2M-Jones

May 2003

Revision No. 0
Contract N62467-99-C-0960
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1 Contents

2	Section	Page
3	Acronyms and Abbreviations	x
4	1.0 Introduction.....	1-1
5	1.1 Background and Summary of the RFI Report Addendum/IM	
6	Completion Report/CMS Work Plan	1-1
7	1.2 Purpose of the RFI Report Addendum/IM Completion Report/CMS	
8	Work Plan	1-2
9	1.3 Site Background and Setting.....	1-2
10	1.3.1 SWMU 5	1-2
11	1.3.2 SWMU 18	1-2
12	1.3.3 AOC 605	1-3
13	1.3.4 AOC 621	1-3
14	1.4 Report Organization.....	1-3
15	Figure 1-1 Site Location of Combined SWMU 14 in Zone H	1-6
16	Figure 1-2 Aerial Photograph of Combined SWMU 14	1-7
17	2.0 Summary of Previous Investigations at Combined SWMU 5.....	2-1
18	2.1 Overview of Previous Investigations	2-1
19	2.2 RFI Sampling and Analysis.....	2-2
20	2.2.1 Surface Soil Results.....	2-3
21	2.2.2 Subsurface Soil Results	2-4
22	2.2.3 Groundwater Results	2-5
23	2.3 RFI Human Health Risk Assessment (HHRA).....	2-6
24	Table 2-1 Site Investigation and Remediation History.....	2-7
25	Figure 2-1 RFI Soil Sample Locations	2-9
26	Figure 2-2 RFI Monitoring Well Locations	2-10
27	3.0 Summary of UST/AST Removals and Interim Measures at Combined	
28	 SWMU 5	3-1
29	3.1 UST/AST Removals.....	3-1
30	3.2 Interim Measures.....	3-1
31	3.2.1 SWMU 18 PCB Spill Cleanup.....	3-1

1 Contents, Continued

2	3.2.2	1998 DET IM.....	3-1
3	3.2.3	CH2M-Jones Interim Measure	3-2
4	4.0	Summary of Additional Investigations.....	4-1
5	4.1	1999 Soil Sampling (AOC 621).....	4-1
6	4.1.1	Surface Soil Results.....	4-1
7	4.1.2	Subsurface Soil Results	4-2
8	4.2	2001 – 2002 IM Investigations	4-2
9	4.2.1	Surface Soil Results.....	4-2
10	4.2.2	Subsurface Soil Results	4-3
11	4.2.3	Intermediate Interval Soil Results	4-3
12	4.3	1996 – 2003 Groundwater Sampling	4-3
13	4.3.1	Inorganics in Groundwater	4-4
14	4.3.2	Organics in Groundwater.....	4-5
15	4.4	COPC Summary	4-5
16	Table 4-1	Detected Inorganic Compounds in Surface Soil Samples from AOC 621	
17		Investigation (1999)	4-6
18	Table 4-2	Detected Organic Compounds in Surface Soil Samples from AOC 621	
19		Investigation (1999)	4-10
20	Table 4-3	Detected Inorganic Compounds in Subsurface Soil Samples from AOC	
21		621 Investigation (1999)	4-13
22	Table 4-4	Detected Organic Compounds in Subsurface Soil Samples from AOC	
23		621 Investigation (1999)	4-17
24	Table 4-5	Detected Inorganic Compounds in Surface Soil Samples from	
25		Post-RFI Sampling	4-19
26	Table 4-6	Detected Organic Compounds in Surface Soil Samples from	
27		Post-RFI Sampling	4-22
28	Table 4-7	Detected Inorganic Compounds in Subsurface Soil Samples from	
29		Post-RFI Sampling	4-25
30	Table 4-8	Detected Organic Compounds in Subsurface Soil Samples from	
31		Post-RFI Sampling	4-28
32	Table 4-9	Intermediate Interval Sample Lead Analytical Results.....	4-30

1 Contents, Continued

2	Table 4-10	Detected Inorganic Compounds from Post-RFI Groundwater	
3		Sampling	4-31
4	Table 4-11	Detected Organic Compounds from Post-RFI Groundwater	
5		Sampling	4-38
6	Figure 4-1	Soil Sample Locations	4-39
7	Figure 4-2	Groundwater Well Locations	4-40
8	5.0	COPC/COC Refinement.....	5-1
9	5.1	Soil VOC Rescreening using DAF=1	5-2
10	5.2	Surface Soil COCs	5-2
11	5.2.1	Antimony	5-2
12	5.2.2	Arsenic	5-3
13	5.2.3	Beryllium	5-4
14	5.2.4	Copper	5-4
15	5.2.5	Lead	5-5
16	5.2.6	BEQs	5-5
17	5.2.7	Dieldrin	5-6
18	5.3	Subsurface Soil COCs	5-6
19	5.3.1	Antimony	5-6
20	5.3.2	Lead	5-7
21	5.4	Summary of Soil COCs	5-7
22	5.5	Groundwater COCs	5-8
23	5.5.1	Antimony	5-8
24	5.5.2	Arsenic	5-8
25	5.5.3	Lead	5-9
26	5.5.4	Dioxin Equivalents (TEQs)	5-9
27	Table 5-1	Detected VOCs in Surface Soil RFI Samples	5-11
28	Table 5-2	Detected VOCs in Subsurface Soil RFI Samples	5-12
29	Table 5-3	Antimony Residual Concentrations in Surface Soil	5-13
30	Table 5-4	Arsenic Concentrations in Surface Soil	5-15
31	Table 5-5	Beryllium Concentrations in Surface Soil	5-17
32	Table 5-6	Copper Residual Concentrations in Surface Soil	5-19
33	Table 5-7	Lead Concentrations in Surface Soil	5-21

1 Contents, Continued

2	Table 5-8	BEQ Concentrations in Surface Soil	5-25
3	Table 5-9	Dieldrin Concentrations in Surface Soil	5-27
4	Table 5-10	Antimony Concentrations in Subsurface Soil.....	5-29
5	Table 5-11	Lead Concentrations in Subsurface Soil.....	5-31
6	Table 5-12	Antimony Concentrations in Groundwater Samples.....	5-35
7	Table 5-13	Arsenic and Iron Concentrations in Groundwater Samples	5-36
8	Table 5-14	Lead Concentrations in Groundwater Samples	5-37
9	Table 5-15	Dioxin Concentrations in Groundwater Samples.....	5-38
10	Figure 5-1	Excavation Areas with Soil Sample Locations	5-41
11	Figure 5-2	½ Acre Exposure areas.....	5-42
12	6.0	Summary of Information Related to Site Closeout Issues	6-1
13	6.1	RFI Status.....	6-1
14	6.2	Presence of Inorganics in Groundwater.....	6-1
15	6.3	Potential Linkage to SWMU 37, Investigated Sanitary Sewers at the	
16		CNC	6-1
17	6.4	Potential Linkage to AOC 699, Investigated Storm Sewers at the CNC..	6-1
18	6.5	Potential Linkage to AOC 504, Investigated Railroad Lines at the CNC	6-2
19	6.6	Potential Migration Pathways to Surface Water Bodies at the CNC	6-2
20	6.7	Potential Contamination in Oil/Water Separators (OWSs)	6-3
21	6.8	Land Use Controls (LUCs)	6-3
22	Table 6-1	Antimony, Arsenic, and Thallium Concentrations in Groundwater	6-4
23	7.0	Interim Measure Completion Report	7-1
24	7.1	Pre-excavation Sampling and Contaminant Delineation	7-1
25	7.2	Technical Approach of the Interim Measure	7-2
26	7.3	Excavation Activities.....	7-2
27	7.3.1	Southern Excavation.....	7-4
28	7.3.2	Northern Excavation	7-4
29	7.3.4	Waste Characterization Sampling	7-4
30	7.3.5	Confirmation Sampling	7-5
31	7.3.6	Site Restoration	7-5
32	Table 7-1	TCLP Results for Waste Characterization Sample of Concrete	7-6

1 Contents, Continued

2	Table 7-2	Lead TCLP Results for Waste Characterization Samples	7-7
3	Table 7-3	Lead Concentrations in Confirmation Samples	7-8
4	Figure 7-1	Confirmations Sample Locations	7-9
5	8.0	Conclusions and Recommendations.....	8-1
6	9.0	CMS Work Plan for Combined SWMU 5	9-1
7	9.1	Remedial Action Objectives	9-1
8	9.2	Remedial Goal Options and Proposed Media Cleanup Standards	9-1
9	9.3	Corrective Measures Evaluation	9-2
10	9.4	CMS Approach	9-2
11	9.5	Approach to Evaluating Corrective Measure Alternatives	9-2
12	9.6	CMS Report	9-4
13	Table 9-1	Outline of CMS Report for Combined SWMU 5.....	9-5
14	10.0	References	10-1
15			
16	Appendices		
17	A	Copy of the <i>Interim/Stabilization Measure Completion Report for SWMU 5, AOC 506 &</i>	
18		<i>AOC 621, Charleston Naval Complex, Charleston SC (DET, 1998)</i>	
19	B	Copies of Figures 4-1 and 4-2 from the <i>Phase II Interim Measure Work Plan; Soil</i>	
20		<i>Removal, SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E, Revision 0 (CH2M-</i>	
21		<i>Jones, 2002)</i>	
22	C	Data Summary Tables for Samples Not Previously Presented	
23	D	Data Validation Summary for Samples Not Previously Presented	
24	E	Soil Boring Logs for the Replacement Wells for E605GW004, E605GW005, and	
25		E605GW006	
26	F	Summary Statistics for Residual COPCs/COCs	
27	G	Historical Drawings of the Combined SWMU 5 Area	
28	H	Calculations for the Dioxin Equivalent Values (TEQ)	

1 **Contents, Continued**

- 2 **I** Responses to SCDHEC Comments on the Combined SWMU 5 Sites from the *Zone E*
- 3 *RFI Report, Revision 0*
- 4 **J** Waste Disposal Manifests for Concrete Debris Removed from Combined SWMU 5
- 5 **K** Hazardous Waste Manifests for Lead-Impacted Soil Excavated from the Site
- 6 **L** Photographs taken during and after Completion of the 2002/2003 IM

1.0 Introduction

In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which regulates closure and transition of property to the community. The Charleston Naval Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval Shipyard and NAVBASE on April 1, 1996.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA), with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560).

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Investigation (RFI) for Solid Waste Management Units (SWMUs) 5 and 18 and Areas of Concern (AOCs) 605 and 621 in Zone E of CNC. These units were investigated together during the RFI due to their proximity, and will be referred to as Combined SWMU 5 in this report. The location of Combined SWMU 5 in Zone E is shown in Figure 1-1. Figure 1-2 shows an aerial photograph of the site.

1.1 Background and Summary of the RFI Report Addendum/IM Completion Report/CMS Work Plan

As part of the RCRA CA activities at the CNC, an RFI was conducted by EnSafe Inc. (EnSafe) in 1997 for Combined SWMU 5. Combined SWMU 5 is located in the industrial area of Zone E between Pierside Street and Dry Dock No. 4. Following completion of these RFI activities the Environmental Detachment (DET) conducted an Interim Measure (IM) at the site. The IM was intended to remove lead-impacted soils with concentrations above 1,300 milligrams per kilogram (mg/kg). The DET's final excavation at SWMU 5 measured approximately 70 feet (ft) long by 30 ft wide, and 4.5 ft deep. Approximately 510 cubic yards (yd³) of lead-impacted soils were removed.

Additional soil sampling and analysis was performed by CH2M-Jones at Combined SWMU 5 to further delineate the extent of contamination and confirm additional remediation requirements. These investigations identified several locations within Combined SWMU 5

that were targeted for soil removal during an IM performed by CH2M-Jones in January 2003. The post-RFI investigations and IM activities are described in detail in Sections 3.0 and 4.0 of this report.

1.2 Purpose of the RFI Report Addendum/IM Completion Report/CMS Work Plan

This RFI Report Addendum/IM Completion Report/CMS Work Plan (RFIRA/IMCR/CMSWP) provides information regarding various site investigations and interim measures conducted at Combined SWMU 5. A CMSWP is presented in Section 9.0 to address remaining surface soil chemicals of concern (COCs).

Prior to changing the status of any site in the CNC RCRA CA permit, the BRAC Cleanup Team (BCT) agreed that the following issues should be addressed:

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage of SWMU/ AOC to SWMU 37 (investigated sanitary sewers)
- Potential linkage of SWMU/AOC to AOC 699 (investigated stormwater sewers)
- Potential linkage of SWMU/AOC to AOC 504 (investigated railroad lines)
- Potential migration pathways to surface water bodies (Zone J)
- Potential contamination associated with oil/water separators (OWSs)
- Relevance or need for land use controls (LUCs) at the site

Information regarding these issues is provided in this RFIRA/IMCR/CMSWP to expedite evaluation of the site.

1.3 Site Background and Setting

1.3.1 SWMU 5

SWMU 5 is a former battery electrolyte treatment area adjacent to Pad 1278 and Dry Dock 4. Associated with battery salvaging, restoring, and recharging operations, this site was used to neutralize submarine battery acid from 1962 until 1985. It consisted of a battery disassembly platform, two neutralization tanks, and customized transporting railcars.

1.3.2 SWMU 18

SWMU 18 is a former polychlorinated biphenyl (PCB) spill area at the Public Works Resource Recovery Facility Storage Area. In June 1987, a contractor was loading PCB-

containing items when a transformer broke and discharged approximately 75 gallons of Pyranol insulating fluid onto the ground. Shortly thereafter soil excavation was conducted to remediate the spill.

1.3.3 AOC 605

AOC 605 is a waste paint storage area adjacent to Dry Dock 4 on Pad 1278. The 40-ft by 250-ft concrete pad was constructed in 1943 as a welding area. Since 1987, the pad has been used to store materials such as paints, used oils, solvents, and chemicals. The pad is bordered to the south and west by unpaved areas.

1.3.4 AOC 621

AOC 621 comprises the battery cracking area associated with SWMUs 5 and 18 and AOC 605. The unit is a concrete pad surrounded by a 1 ft-high concrete containment wall. AOC 621 was used as a welding slab from the early 1940s until around 1950. From the early 1950s to the mid-1970s this work area was used for wrecking submarine batteries, with operations including cracking batteries and draining the acids to recover lead and container cells, which were sold for scrap. A collection sump drained acid from the pad to the neutralization facility. An adjacent crane was used to move batteries around the work area. Concrete and asphalt pavement surrounded AOC 621, except for an area of soil and gravel to the southwest.

The area where Combined SWMU 5 is located is zoned M-2, heavy marine industrial use. The site is expected to be used for industrial use for the foreseeable future.

1.4 Report Organization

This RFIRA/IMCR/CMSWP consists of the following sections, including this introductory section:

1.0 Introduction – Presents the purpose of the report and background information relating to the RFIRA/IMCR/CMSWP.

2.0 Summary of Previous Investigations at Combined SWMU 5– Summarizes the conclusions from the RFI and risk evaluations for Combined SWMU 5 as presented in the *Zone E RFI Report, Revision 0* (EnSafe, 1997).

3.0 Summary of Interim Measures at Combined SWMU 5– Provides information regarding the IMs conducted at the site during 1998 by the DET and in 2002/2003 by CH2M-Jones.

4.0 Summary of Additional Investigations – Presents the details and summarizes the results of additional soil and groundwater investigations conducted after submission of the *Zone E RFI Report, Revision 0*.

5.0 COPC/COC Refinement – Provides further evaluation of chemicals of potential concern (COPCs) based on the RFI and additional data to assess them as COCs.

6.0 Summary of Information Related to Site Closeout Issues – Discusses the various site closeout issues that the BCT agreed to evaluate prior to site closeout.

7.0 Interim Measure Completion Report - Presents the details and results of the soil removal IM that was completed by CH2M-Jones during 2002/2003.

8.0 Conclusions and Recommendations– Provides recommendations for proceeding with the RCRA CA process.

9.0 CMS Work Plan for Combined SWMU 5 - Provides a CMSWP to address COCs that have been identified in soils at Combined SWMU 5.

10.0 References – Lists the references used in this document.

Appendix A contains a copy of the *Interim/Stabilization Measure Completion Report for SWMU 5, AOC 506 & AOC 621, Charleston Naval Complex, Charleston SC* (DET, 1998).

Appendix B contains copies of Figures 4-1 and 4-2 from the *Phase II Interim Measure Work Plan; Soil Removal, SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E, Revision 0* (CH2M-Jones, 2002), which depict the distribution of lead and approximate surface soil and subsurface soil excavation areas.

Appendix C contains the complete data summary tables for the samples collected that have not been previously presented.

Appendix D contains the data validation summary for the samples collected that have not been previously presented.

Appendix E contains soil boring logs for the replacement wells for E605GW004, E605GW005, and E605GW006.

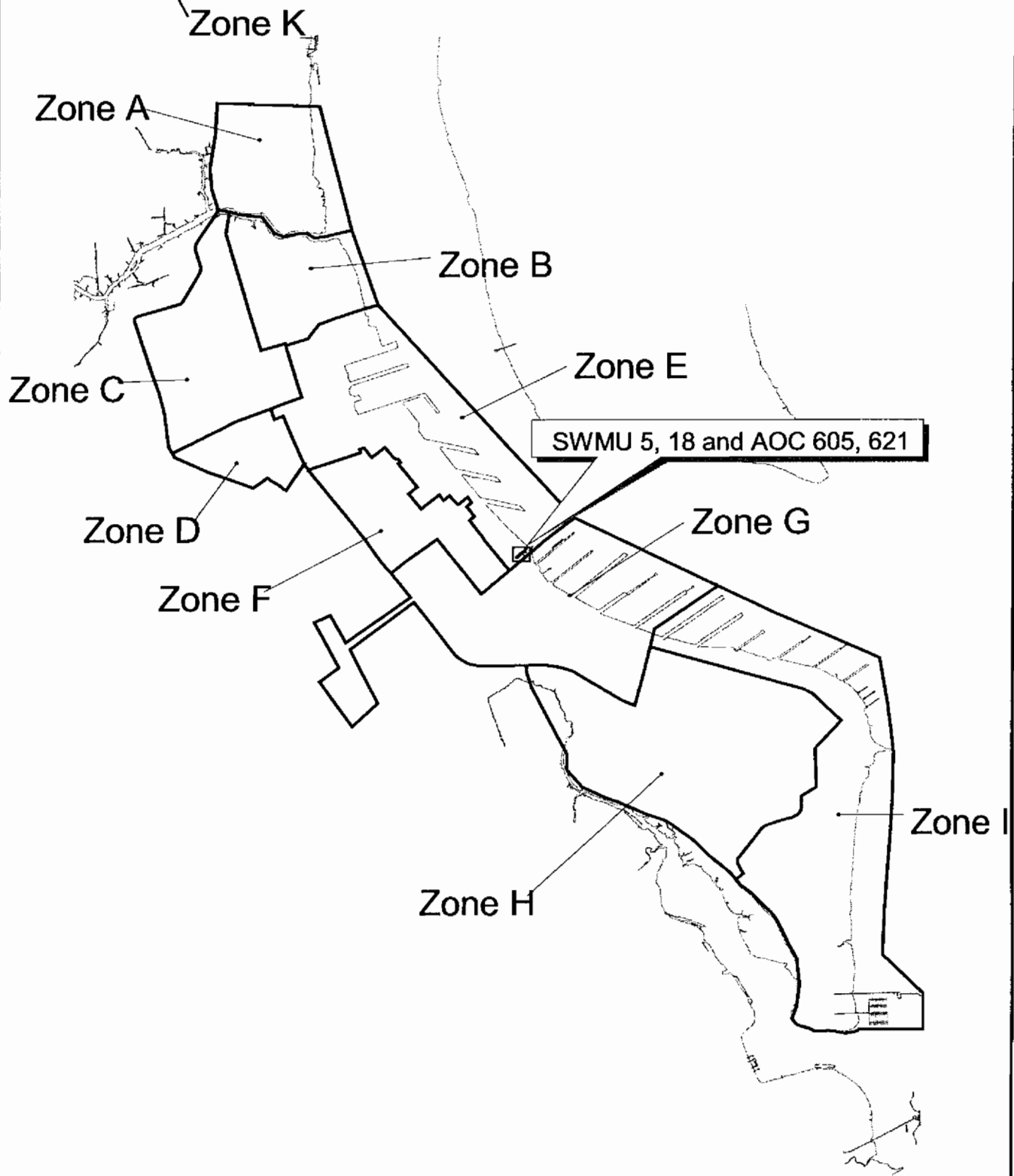
Appendix F contains summary statistics for residual COPCs/COCs.

Appendix G contains historical drawings of the Combined SWMU 5 area.

Appendix H contains the calculations for the dioxin equivalent values (TEQ).

- 1 **Appendix I** contains responses to SCDHEC comments regarding the combined SWMU 5
- 2 sites from the *Zone E RFI Report, Revision 0*.
- 3 **Appendix J** contains the waste disposal manifests for the concrete debris removed from
- 4 Combined SWMU 5.
- 5 **Appendix K** contains the hazardous waste manifests for the lead-impacted soil that was
- 6 excavated from the site.
- 7 **Appendix L** contains photographs taken during and after completion of the 2002/2003 IM
- 8 by CH2M-Jones.
- 9 All figures and tables appear at the end of their respective sections.

NOTE: Original figure in color



Shoreline
Zone Boundary

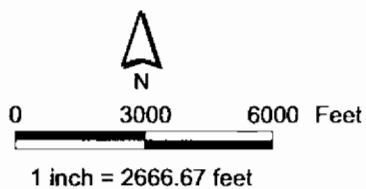
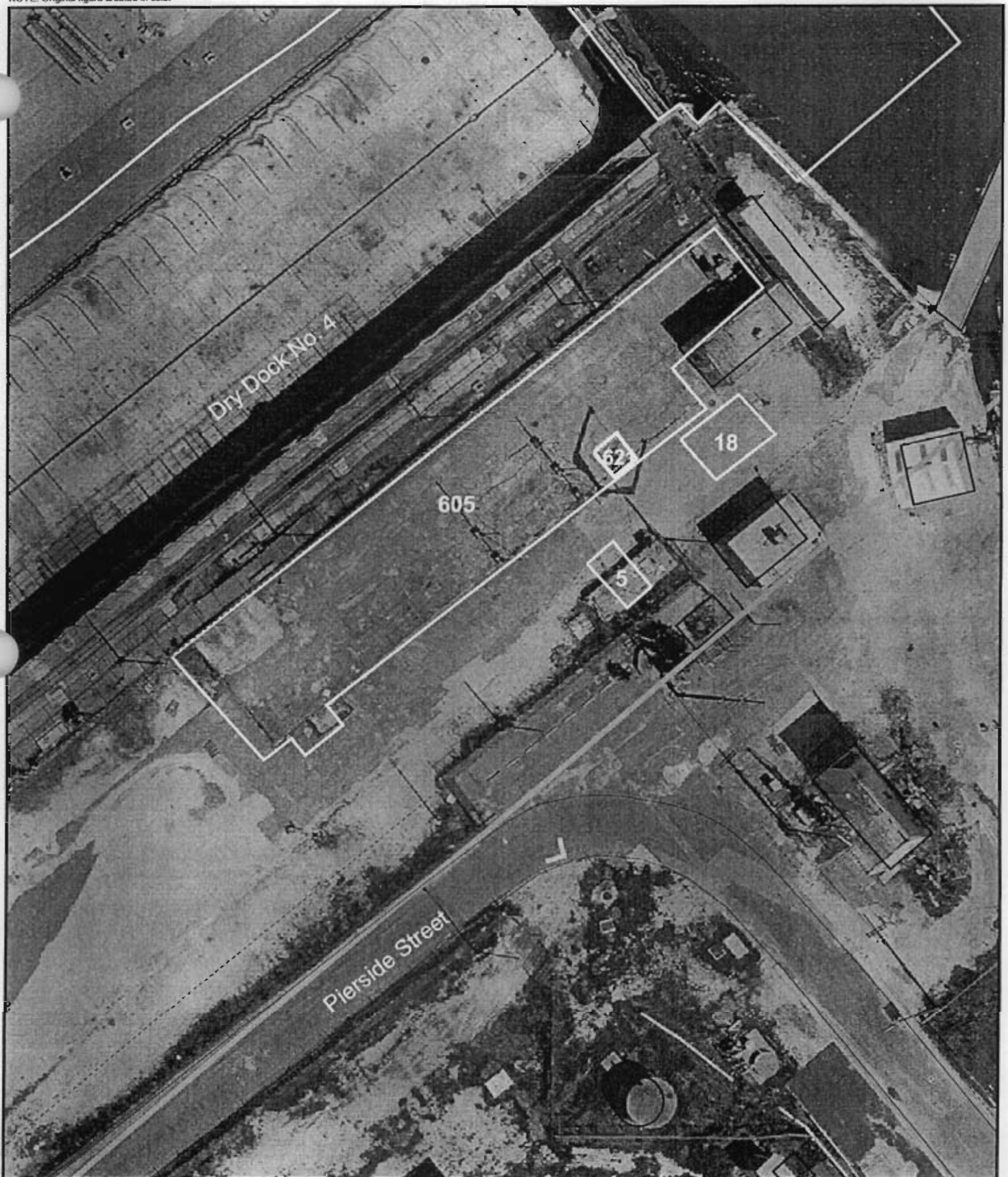


Figure 1-1
Site Location Map
SWMU 5, SWMU 18, AOC 605, and AOC 621
Zone E
Charleston Naval Complex

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NOTE: Original figure created in color



- Fence
- Railroads
- Roads
- AOC Boundary
- SWMU Boundary
- Buildings

Zone Boundary



0 40 80 Feet

1 inch = 50 feet

Figure 1-2
Site Map

SWMU 5, SWMU 18, AOC 605, and AOC 621
Zone E

Charleston Naval Complex

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2.0 Summary of Previous Investigations at Combined SWMU 5

2.1 Overview of Previous Investigations

A variety of investigations have been carried out at this site. Table 2-1 shows a timeline of the previous investigations and IMs implemented at Combined SWMU 5. This section also discusses the RFI activities and conclusions as reported in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). Additional sampling and analysis activities conducted after submittal of the RFI report are presented and discussed in Section 4.0 of this RFIRA/IMCR/CMSWP.

The previous investigations at Combined SWMU 5 occurred in the following chronological sequence:

1980s – In 1987 the RCRA Facility Assessment (RFA) was conducted at SWMUs 5 and 18 (EBASCO, 1987). Other than a reddish-brown area of discolored soil observed near the battery disassembly platform during the visual inspection, no evidence of a release was noted.

1995-1997 – During this time 15 soil borings were advanced and five shallow monitoring wells were installed and sampled at SWMU 5. Soil samples were collected in 1995. The groundwater monitoring wells were sampled in April 1996, July 1996, October 1996, and January 1997. The first round of quarterly results were presented in the *Zone E RFI Report, Revision 0*. The details of the RFI are presented in Section 2.2.

1997-1998 – An IM was conducted by DET in 1997 and 1998. The goal of the IM was to remove lead-impacted soils with concentrations above the industrial risk-based concentration (RBC) of 1,300 mg/kg. IM activities included abandoning monitoring well F605GW002. The details of the DET's IM are discussed in Section 3.2 of this RFIRA/IMCR/CMSWP. A copy of the IMCR for this effort is included as Appendix A.

1999 – Twenty-six soil borings were advanced in January 1999 at AOC 621 by the Navy/EnSafe team. The investigation included collecting 26 surface soil samples and 25 subsurface soil samples. Samples collected from soil borings E621SB001 through E621SB004 were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, metals, pesticides, cyanide, and organotins. The remainder of the samples

1 were analyzed for metals only. The data from these samples are discussed in Section 4.0 of
2 this RFIRA/IMCR/CMSWP.

3 **2001-2002** – CH2M-Jones continued soil and groundwater investigations to evaluate
4 residual soil conditions, collect data to determine site-specific SSLs, evaluate shallow
5 groundwater water quality, and support an IM. The data from these investigations were
6 evaluated and presented in the *Phase II Interim Measure Work Plan; Soil Removal, SWMU 5,*
7 *SWMU 18, AOC 605, and AOC 621 Zone E, Revision 0* (CH2M-Jones, 2002). An IM was then
8 conducted by CH2M-Jones to remove lead-impacted soil at combined SWMU 5. All
9 removed material was transported to offsite disposal facilities. These efforts are described in
10 further detail in Section 7.0.

11 **2.2 RFI Sampling and Analysis**

12 This section presents the results of the soil and groundwater sampling and analysis
13 conducted at Combined SWMU 5 as part of the Zone E RFI. The RFI report evaluated the
14 data from the first round of groundwater sampling only.

15 Some of the data collected during the initial RFI are no longer representative of current site
16 conditions as a result of the IMs conducted by the DET and CH2M-Jones, which removed
17 contaminated surface soil from the site. Figure 2-1 presents the locations of soil borings
18 advanced at the site during the RFI. Figure 2-2 shows the locations of site monitoring wells
19 installed during the original RFI field effort.

20 Soil samples were collected during two events. Nineteen surface soil and 13 subsurface soil
21 samples were collected during the first event, and five surface soil and four subsurface soil
22 samples were collected during the second event. Soil samples were analyzed for VOCs,
23 SVOCs, metals, cyanide, PCBs, pesticides, and organotins. Two surface and two subsurface
24 soil samples were collected as duplicates in the first event. Two duplicate surface soil
25 samples were collected in the second event and were submitted for Appendix IX analysis,
26 which includes herbicides, hexavalent chromium, organophosphorus pesticides, dioxins,
27 and a more extensive list of VOCs and SVOCs.

28 Five shallow groundwater monitoring wells were installed to assess groundwater quality at
29 the site. Only the first set of groundwater samples collected in March 1996 was used in the
30 RFI site evaluation, although the data for three additional rounds were included in
31 Appendix H of the *Zone E RFI Report, Revision 0*. RFI groundwater samples were analyzed
32 for VOCs, SVOCs, metals, cyanide, PCBs, pesticides, chlorides, sulfates, total dissolved

solids (TDS), and organotins. One duplicate sample was submitted for Appendix IX analysis. The soil and groundwater COCs identified in the RFI report are further evaluated in Section 5.0 of this report.

2.2.1 Surface Soil Results

COPC screening criteria for surface soil during the RFI consisted of U.S. Environmental Protection Agency (EPA) Region III industrial RBCs (hazard index [HI]=0.1 for non-carcinogens) for organics and inorganics, and Zone E background reference concentrations (BRCs) for inorganics. The analytical results from surface soil sampling were compared against these criteria with the following results.

VOCs

Three VOCs were detected in surface soil. No VOCs were detected above their respective industrial RBCs (HI=0.1) in surface soil.

SVOCs

Twenty-five SVOCs were detected in surface soil. Benzo[a]pyrene and dibenz[a,h]anthracene exceeded their respective industrial RBCs. Calculated benzo[a]pyrene equivalent (BEQ) concentrations exceeded the benzo[a]pyrene industrial RBC in seven of 24 surface soil samples.

Pesticides/PCBs

Twelve pesticides and one PCB were detected in surface soil. No pesticides or PCBs exceeded their respective industrial RBC in surface soil samples collected.

Organotins

No organotins were detected in surface soil samples.

TEQs

Twelve dioxin congeners were detected in surface soil. Calculated TEQ concentrations were all below the residential action level of 1,000 nanograms per kilogram (ng/kg) (which was used as the COPC screening criteria) as well as the current dioxin RBC (4.3 ng/kg).

Metals

Twenty-four metals were detected in surface soil. Arsenic, beryllium, and lead exceeded their industrial RBCs and Zone E BRCs in at least one surface soil sample. Arsenic was detected in one surface soil sample above its RBC and BRC. Four surface soil samples

contained beryllium at concentrations above its industrial RBC and BRC. Lead exceeded its industrial RBC and BRC in three surface soil samples.

2.2.2 Subsurface Soil Results

COPC screening criteria for subsurface soil consisted of generic soil screening levels (SSLs) (based on a dilution attenuation factor [DAF]=10) and, for inorganics the Zone E BRCs. Inorganic chemical concentrations were compared with the higher of the BRC or SSL values. Analytical results from subsurface soil sampling were compared against these criteria with the following results.

VOCs

Two VOCs were detected in subsurface soil. No VOCs exceeded their respective SSLs.

SVOCs

Twenty-five SVOCs were detected in subsurface soil. Three SVOCs (benzo[a]anthracene, chrysene, and 2,4-dinitrotoluene) exceeded their respective SSLs. Benzo[a]anthracene and chrysene exceeded their respective SSLs in the one subsurface sample (605B01502). 2,4-Dinitrotoluene exceeded its SSL in one sample (605B01002).

Pesticides/PCBs

Ten pesticides and one PCB were detected in subsurface soil sample. In one sample (018SB00302) alpha-BHC exceeded its SSL. Aroclor-1260 was detected in two subsurface soil samples. The RFI did not compare PCB concentrations to SSLs.

Organotins

No organotins were detected in subsurface soil at Combined SWMU 5.

Metals

Twenty-four metals were detected in subsurface soil. Arsenic and barium exceeded their respective SSLs and BRCs. One subsurface soil sample (605SB01402) contained arsenic at concentrations that exceeded its SSL and BRC. Barium exceeded its SSL in one sample (605SB01502).

The Fate and Transport Section (10.1.5) of the RFI report evaluated surface and subsurface soil data to determine if any compounds represent a threat to shallow groundwater, and whether they should be considered subsurface soil COCs at SWMU 5. The RFI report concluded that seven inorganic compounds were present in site soil at concentrations that exceed their respective SSLs and BRCs. Five of these (antimony, arsenic, cobalt, lead, and

nickel) were also detected in groundwater, indicating a potential complete pathway for these inorganic compounds. Eight organic compounds were also detected in soil at concentrations that exceeded their respective SSLs, but were not detected in groundwater, indicating that existing concentrations of organic compounds are sufficiently protective of shallow groundwater.

2.2.3 Groundwater Results

Analytical results from the first round of groundwater sampling were compared with the EPA Region III tap water RBCs and, for inorganics, the Zone E BRCs. The analytical results from groundwater sampling were compared against these criteria with the following results.

VOCs

No VOCs were detected in groundwater.

SVOCs

Ten SVOCs were detected in shallow groundwater. No SVOCs exceeded their respective EPA Region III tap water RBCs.

Pesticides/PCBs

No pesticides or PCBs were detected in groundwater.

Tributyltin

Tributyltin was detected in one groundwater sample. Screening against an RBC or maximum contaminant level (MCL) was not conducted during the Zone E RFI.

TEQs

One dioxin congener, 2,3,4,6,7,8-HxCDF, was reported for the groundwater duplicate sample. The TEQ (dioxin equivalent) value was calculated to be 62.6 picograms per liter (pg/L), which exceeds the EPA Region III tap water RBC for 2,3,7,8-TCDD. However, the laboratory qualifier for this chemical was an "estimated maximum possible concentration," and the reported value is of questionable validity.

Metals

Sixteen metals were detected in groundwater.

The RFI report concluded that antimony, arsenic, and lead were present at concentrations that exceeded their respective EPA Region III tap water RBCs and Zone E BRCs. These

analytes were identified as groundwater COPCs, in addition to dioxin equivalents, at Combined SWMU 5.

2.3 RFI Human Health Risk Assessment (HHRA)

Section 10.1.6 of the *Zone E RFI Report, Revision 0* presents the HHRA that was conducted for Combined SWMU 5. Soil data collected during the RFI and groundwater data from the first round of RFI sampling were used in this HHRA.

The HHRA identified the following COCs for surface soil at Combined SWMU 5:

- **Unrestricted (i.e., Residential) Land Use Scenario** – Antimony, arsenic, BEQs, beryllium, copper, lead, and zinc
- **Industrial Land Use Scenario** – Arsenic, BEQs, and beryllium

The HHRA identified the following chemicals in groundwater as contributing to elevated risk/HI:

- Antimony, arsenic, and dioxin equivalents. Lead was detected above its treatment technique action level (TTAL).

The RFI report recommended a CMS be performed for soil and shallow groundwater at the site based on potential risks posed by the COCs/COPCs.

The COCs identified in the RFI report are further addressed in Sections 3.0, 4.0, and 5.0 of this RFIRA/IMCR/CMSWP as targets of IMs and investigations, and, to the extent that they remained on site after the IMs, to determine if they are COCs based on current site conditions.

TABLE 2-1

Site Investigation and Remediation History

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 618, Zone E, Charleston Naval Complex

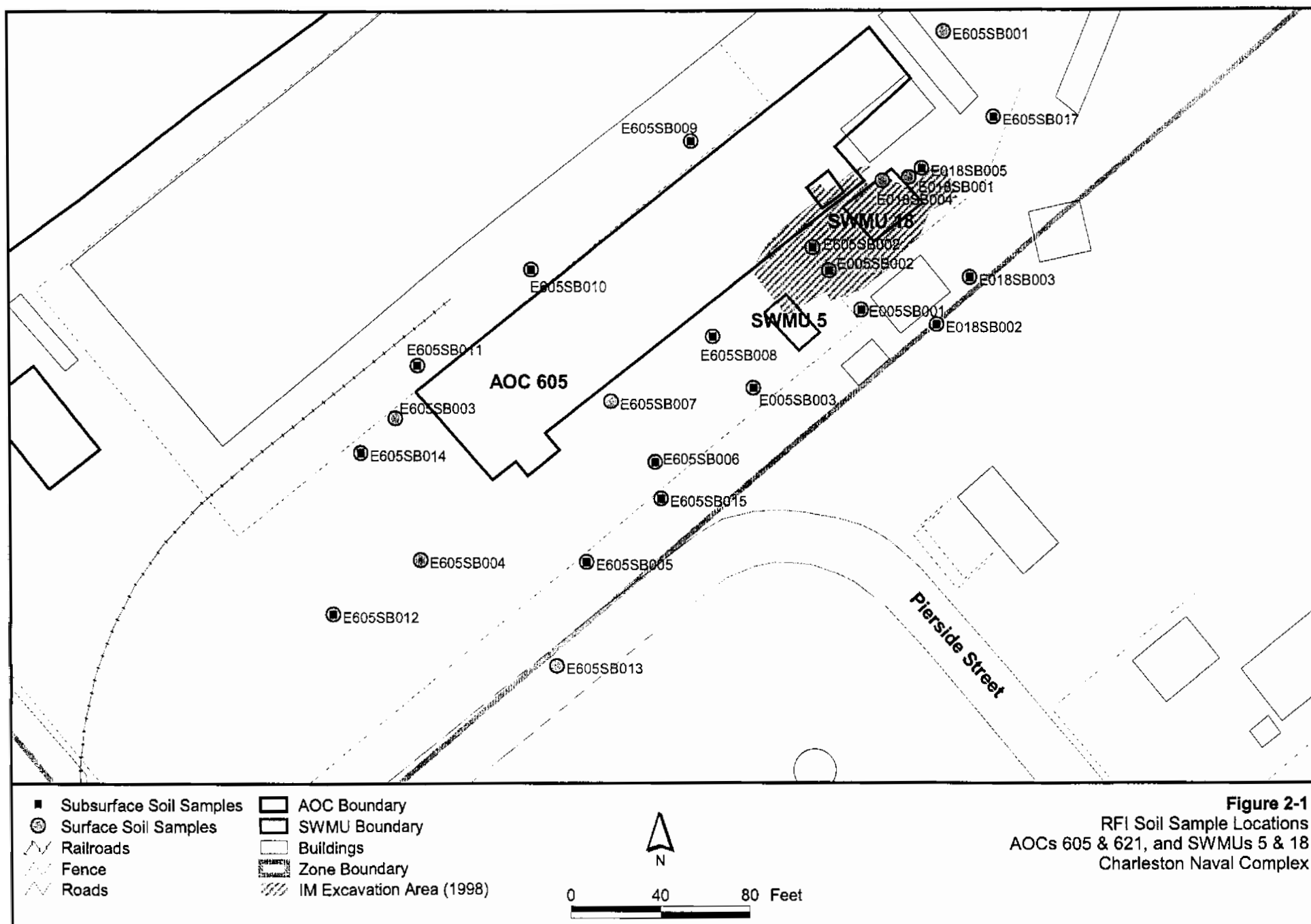
Date	Media Investigated	Sample Stations	Reporting Document	Phase
1987 (SWMUs 5 & 18)	None	Visual Inspection	RFA, Ebasco, 1987	RFA
1995 (AOCs 605 & 621)	None	Visual Inspection	RFA, EnSafe/Allen & Hoshall, 1995	RFA
September & October 1995	Surface and Subsurface Soil	E005SB001-003 E018SB001-005 E605SB001-011	RFI EnSafe Inc., November 1997	RFI
March 1996	Groundwater	E018GW001-002 E605GW001-003	RFI EnSafe Inc., November 1997	RFI
May & September 1996	Surface and Subsurface Soil	E605SB011-015 and E605SB017	RFI EnSafe Inc., November 1997	RFI
July 1996	Groundwater	E018GW001-002 E605GW001-003	Appendix H of the Zone E RFI, EnSafe Inc., 1997 (not discussed in text)	RFI
October 1996	Groundwater	E018GW001-002 E605GW001-003	Appendix H of the Zone E RFI, EnSafe Inc., 1997 (not discussed in text)	RFI
January 1997	Groundwater	E018GW001-002 E605GW001-003	Appendix H of the Zone E RFI, EnSafe Inc., 1997 (not discussed in text)	RFI
April 1998	Surface and Subsurface Soil Removal	72 Confirmation Samples Collected	Interim/Stabilization Measure for SWMU 5, AOC605 & 621 (DET, April 1998)	
January 1999 (AOC 621)	Surface and Subsurface Soil	E621SB001-004	None	RFI
July 1999 (AOC 621)	Surface and Subsurface Soil	E621SB005-010, E621SB012-020, and E621SB022-028	None	RFI
November 2001	Surface and Subsurface Soil	E005SB004-019, E005SB021-030, E005SB032-035, and E005SB037-051	Phase II IMWP (CH2M-Jones, April 2002)	IMWP
December 2001	Groundwater	E018GW001-002 E605GW004-006	SWMU 5 RFIRA (CH2M-Jones, TBD)	RFIRA
February 2002	Surface and Subsurface Soil	E005SB052-059	Phase II IMWP (CH2M-Jones, April 2002)	IMWP
September	Groundwater	E605GW004 and	SWMU 5 RFIRA	RFIRA

TABLE 2-1

Site Investigation and Remediation History

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 618, Zone E, Charleston Naval Complex

Date	Media Investigated	Sample Stations	Reporting Document	Phase
2002		E605GW005	(CH2M-Jones, TBD)	
October 2002 through January 2003	Surface and Subsurface Soil Removal	E005SB060-67 and E005SB069-071	SWMU 5 RFIRA (CH2M-Jones, TBD)	RFIRA
February 2003	Groundwater	E605GW04R (replacement for E605GW004), E605GW05R (replacement for E605GW005), and E605GW06R (replacement for E605GW006)	SWMU 5 RFIRA (CH2M-Jones, TBD)	RFIRA



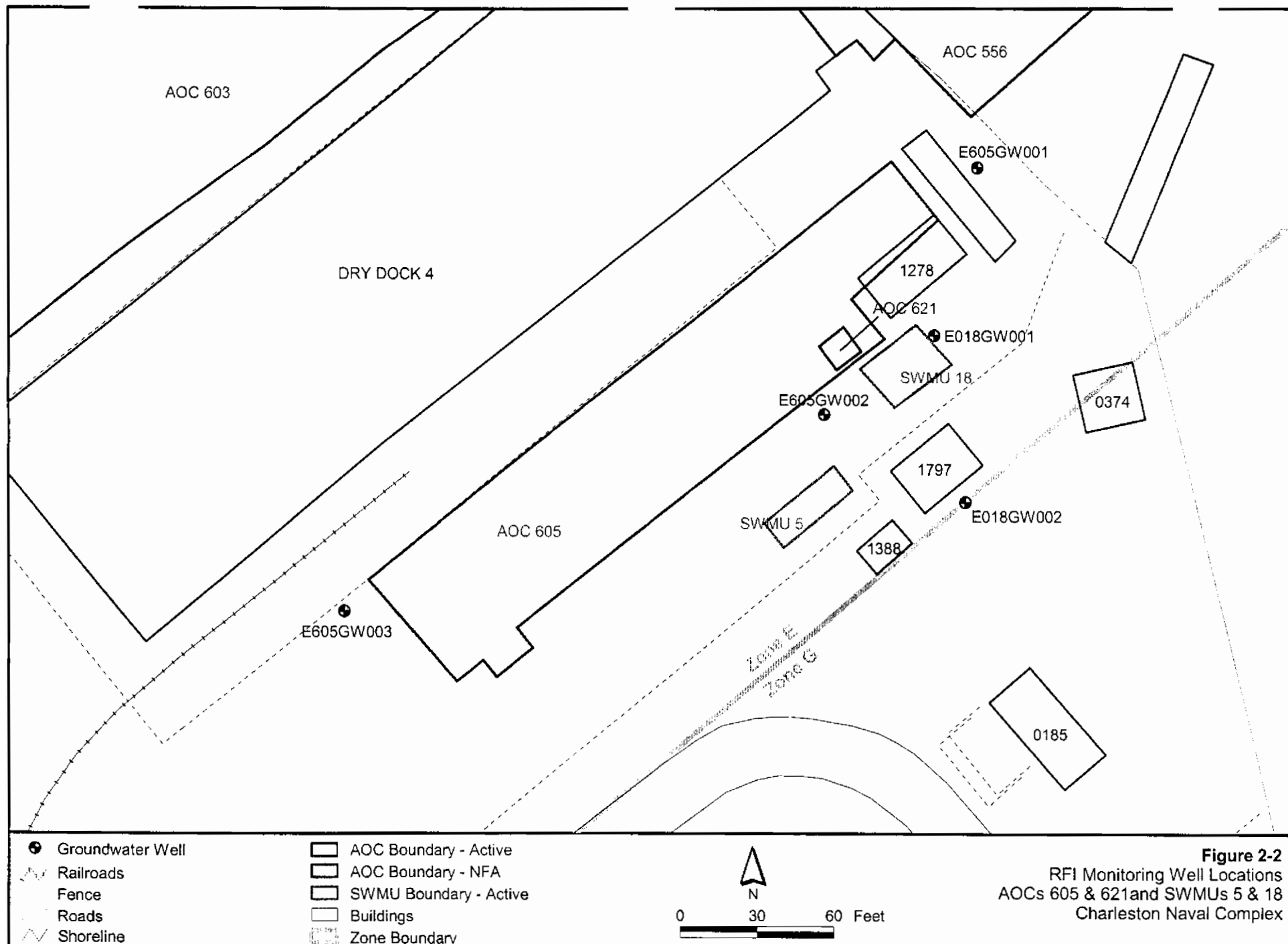


Figure 2-2
RFI Monitoring Well Locations
AOCs 605 & 621 and SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

3.0 Summary of UST/AST Removals and Interim Measures at Combined SWMU 5

3.1 UST/AST Removals

Neither the RFA nor the RFI reports refer to the presence or possible presence of any fuel underground storage tanks (USTs) or aboveground storage tanks (ASTs) at SWMU 5. According to the Navy (NAVFAC, 2001), there were no storage tanks associated with this site.

3.2 Interim Measures

3.2.1 SWMU 18 PCB Spill Cleanup

On June 12, 1987, a transformer discharged approximately 75 gallons of Pyranol insulating fluid onto the ground at SWMU 18. The PCB spill was contained by shipyard personnel, and then the soil was excavated to a visual standard. Twenty-two drums of material were removed. Confirmation samples collected to verify that the site was adequately remediated indicated that additional excavation was necessary.

An additional 22 tons of soil were removed and a second round of confirmation samples was collected. The analytical results from these confirmation samples indicated that even further excavation was necessary. After this third excavation was completed and a final round of confirmation samples was collected, the results indicated that further excavation was not required.

3.2.2 1998 DET IM

After submission of the *Zone E RFI Report, Revision 0* and before the proposed CMS, the Navy performed an IM at Combined SWMU 5. The goal of the IM was to remove lead-impacted soil with concentrations that exceeded the target cleanup level of 1,300 mg/kg (based on industrial land use). The IM was performed in 1997 and 1998. Appendix A contains a copy of the IMCR (DET, 1998). The area of the final excavation boundary is shown on Figure 9 of the IMCR (see Appendix A).

The initial scope of the DET's IM included the removal of lead-impacted soil from three isolated locations at the site. The dimensions for each excavation were expected to be

1 approximately 6-ft by 6-ft, and 2-ft deep. However, the initial excavations were expanded
2 into a single excavation that included removal of soil between Building 1435 and Pad 1278
3 and a small area to the southwest of Building 1435. The depth of the initial excavation was
4 extended to the depth of the subsurface samples (3 to 5 feet below land surface [ft bls]).
5 Confirmation sample results indicated that additional excavation was necessary. Building
6 1435 was relocated following the initial excavation and additional delineation samples were
7 collected.

8 The area of the excavation was expanded four times during the course of the IM, based on
9 the results of confirmation samples collected after each phase of the excavation. Following
10 the fourth excavation expansion the confirmation samples indicated that the goal of the IM
11 had been met and excavation activities were terminated. The final excavation was
12 approximately 70-ft by 30-ft, and 4.5-ft deep. Approximately 510 tons of lead-impacted soil
13 were removed and disposed of as hazardous waste. Prior to backfilling, a 1 ft-thick layer of
14 soil/lime mixture (ratio 1:1,000) was applied to the bottom of the excavation. The purpose of
15 the lime was to precipitate leachable lead to further stabilize the site. The remainder of the
16 excavation was backfilled with clean soil.

17 **3.2.3 CH2M-Jones Interim Measure**

18 From November 2001 to February 2002, CH2M-Jones conducted pre-excavation delineation
19 and synthetic precipitation leaching procedure (SPLP) sampling to support the Combined
20 SWMU 5 IM. The results of this investigation were reviewed, media cleanup standards
21 (MCSs) were proposed, and additional areas requiring remediation were identified (see
22 *Phase II Interim Measure Work Plan; Soil Removal, SWMU 5, SWMU 18, AOC 605, and AOC 621*
23 *Zone E, Revision 0* [CH2M-Jones, 2002). Target MCSs for lead were 1,218 mg/kg for surface
24 soil under the industrial worker scenario and 1,427 mg/kg (established for protection of
25 groundwater under an unpaved land use scenario).

26 The IM excavation began in October 2002 and was completed in January 2003.
27 Approximately 460 tons of contaminated soil were excavated and disposed of offsite. Copies
28 of Figures 4-1 and 4-2 from the Phase II IMWP, which present the excavated areas, are
29 included in Appendix B. The results of these investigations are presented in Section 4.0, and
30 details of the removal actions are presented in the IMCR in Section 7.0.

31 At the conclusion of the IM, an evaluation of the data was conducted to assess whether lead
32 was adequately removed and whether the cleanup objective site soil was achieved at a level
33 that would allow for industrial land usage at this site (see Section 5.0). The results indicate
34 that this objective was achieved. The site was then backfilled with clean fill.

4.0 Summary of Additional Investigations

This section describes the investigations that were conducted at Combined SWMU 5 subsequent to the initial RFI activities presented in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). The soil and groundwater results for investigations conducted after the RFI report were summarized and screened against applicable criteria. Summaries of the detected compounds are presented in tables at the end of this section. Appendix C contains the complete data summary tables and Appendix D contains the data validation summary for samples which were not previously presented. It should be noted that most of the elevated concentration areas have been addressed through removal action in the IM implementation, and some of the soil samples with contamination that are discussed in this section were collected prior to implementation of the IM by CH2M-Jones (see Section 3.0, Figure 5-1 and Section 7.0), and thus do not represent current site conditions. Section 5.0 below presents the residual soil concentrations for the previously identified COPCs.

4.1 1999 Soil Sampling (AOC 621)

In January and July 1999, EnSafe advanced 26 soil borings to investigate AOC 621. Samples collected in January (soil borings E621SB001 through E621SB004) were analyzed for metals, cyanide, organotins, pesticides, PCBs, VOCs, and SVOCs. Samples collected in July (soil borings E621SB005 through E621SB010, E621SB012 through E621SB020, and E621SB022 through E621SB028) were analyzed for metals.

The analytical results for surface soil samples were compared to industrial RBCs (HI=0.1), SSLs (DAF=1 for VOCs; DAF=10 or site-specific for other analytes), the Zone E background concentration range for inorganics, and sitewide reference concentrations for BEQs. The analytical results for subsurface soil samples were compared to SSLs (DAF=1 for VOCs; DAF=10 or site-specific for other analytes), the Zone E background concentration range for inorganics, and sitewide reference concentrations for BEQs. Summaries of the detected chemicals are provided in Tables 4-1 through 4-4.

4.1.1 Surface Soil Results

Antimony and lead were the only chemicals detected above their respective industrial RBCs in surface soil samples collected in 1999 at SWMU 621. No organic compounds were detected above their respective industrial RBCs. Dieldrin was detected above its SSL of 2

micrograms per kilogram ($\mu\text{g}/\text{kg}$) in one sample (621SB00101, $2.1 \mu\text{g}/\text{kg}$). Based on these data, antimony, lead, and dieldrin are identified as COPCs for surface soil and are further evaluated in Section 5.0 of this RFIRA/IMCR/CMSWP.

4.1.2 Subsurface Soil Results

Antimony and lead were detected above their respective SSLs in several subsurface soil samples collected in 1999 at SWMU 621. No organic compounds were detected above COPC screening criteria. Based on these data, antimony and lead are identified as COPCs in subsurface soil and are further evaluated in Section 5.0.

4.2 2001 – 2002 IM Investigations

In October 2001, CH2M-Jones submitted a Phase I IMWP for Combined SWMU 5. The objective of the IM was to delineate contaminants and collect SPLP data to calculate site-specific SSLs for lead. A Sampling and Analysis Plan (SAP) (CH2M-Jones, 2002) was developed to collect additional SPLP samples to calculate site-specific SSLs for lead and nickel. A total of 53 soil borings were advanced to meet the goal stated in the *Phase I Interim Measure Work Plan; SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E, Revision 0* (CH2M-Jones, 2001). The samples were analyzed for lead and nickel (totals and SPLP), pesticides, and/or SVOCs, depending on the sample location. As proposed in the Phase I IMWP, five intermediate interval samples were collected to delineate lead-impacted soil in the interval between 1 to 3 ft bls.

The results and the data validation from the surface and subsurface soil samples collected to support the IM were presented in the *Phase II Interim Measure Work Plan; Soil Removal, SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E, Revision 0* (CH2M-Jones, 2002), and were used to determine the appropriate remedial action.

The detected chemicals for the pre-IM samples are presented in Tables 4-5 through 4-8. Table 4-9 presents the intermediate interval sample results. Appendix C contains the data summary tables and Appendix D contains the data validation summary for these samples. Site-specific SSLs for lead and nickel were calculated and presented in the Phase II IMWP. The site-specific SSLs for these metals were used as screening criteria in this section.

4.2.1 Surface Soil Results

Nine surface soil samples contained lead above its background concentration range, industrial RBC, and site-specific SSL. Two other samples contained lead above its background concentration range and industrial RBC, but below its site-specific SSL. Several

1 samples contained nickel above its generic SSL (DAF=10), however it was not detected
2 above its site-specific SSL or industrial RBC in any sample. Dieldrin was detected in one
3 sample (005SB03201) above its SSL. The detected concentration was below its industrial
4 RBC. No other organic compounds were detected above screening criteria.

5 Based on these data, lead and dieldrin are identified as COPCs in surface soil and are
6 further discussed in Section 5.0.

7 **4.2.2 Subsurface Soil Results**

8 Three subsurface soil samples contained lead above its background concentration range and
9 site-specific SSL. One sample contained nickel above its generic SSL (DAF=10), however it
10 was not detected above its site-specific SSL in any sample. No other chemicals were detected
11 above screening criteria.

12 Based on these data, lead is identified as a subsurface soil COPC and is further discussed in
13 Section 5.0.

14 **4.2.3 Intermediate Interval Soil Results**

15 One sample exhibited a lead concentration that exceeded its SSL. The Phase II IMWP
16 Addendum 2 (CH2M-Jones, 2002) evaluated the data from the intermediate interval samples
17 and the excavation was modified to remove this location.

18 Based on these data, lead is identified as a COPC in the intermediate interval.

19 **4.3 1996 – 2003 Groundwater Sampling**

20 As part of the RFI, four rounds of groundwater samples were collected. These samples were
21 collected between March 1996 and January 1999. The first round samples were analyzed for
22 cyanide, metals organotins, PCBs, pesticides, TDS, sulfate, VOCs, and SVOCs. One first
23 round duplicate sample was also analyzed for dioxins and organo-phosphate pesticides.
24 Second round samples were analyzed for metals, organotins, VOCs, SVOCs, TDS, and
25 sulfate. The AOC 605 monitoring well samples were also analyzed for dioxins and the
26 monitoring well E605GW003 sample was also analyzed for herbicides and pesticides
27 (including organo-phosphate pesticides). The third and fourth round samples were
28 analyzed for metals; the samples from monitoring well E018GW001 were also analyzed for
29 TDS and sulfate.

30 At the time of submission of the *Zone E RFI Report, Revision 0*, all four rounds of samples had
31 been collected and the data validated. However, the RFI report compared only the first

round sample results to screening criteria and limited the discussion to the first round of samples only. This section evaluates the analytical results from the second through fourth rounds, as well as the subsequent sampling efforts. Tables 4-10 and 4-11 present the analytical results for detected inorganic and organic chemicals, respectively, in groundwater samples collected after the first sampling event at Combined SWMU 5.

Monitoring well E605GW004 was installed to replace monitoring well E605GW002, which was damaged and abandoned during the DET's IM. In October 2001, CH2M-Jones submitted the Phase I IMWP for SWMU 5 which recommended installation of two new monitoring wells and two contingency wells to evaluate the nature and extent of lead-impacted groundwater at the site. All four wells (E605GW005 through E605GW008) were installed in November 2001. Samples were collected from monitoring wells E018GW001, E018GW002, E506GW004, E506GW005, and E506GW006 in December 2001 and analyzed for metals. The detected analytes from these samples are included in Table 4-10. These data and the validation summary were previously presented to SCDHEC in the Phase II IMWP.

At the request of SCDHEC, monitoring wells E605GW004 and E605GW005 were sampled prior to commencement of the CH2M-Jones IM. Monitoring wells E605GW04R (the replacement well for E605GW004), E605GW05R (the replacement well for E605GW005), and E605GW06R (the replacement well for E605GW006) were sampled following the IM. Monitoring well E605GW006 was located within the excavation area and had to be abandoned prior to the IM. Monitoring wells E605GW004 and E605GW005 were compromised during execution of the IM and were also abandoned. These three wells were replaced and sampled in February 2003. The boring logs corresponding to the installation of these new wells are presented in Appendix E. The pre- and post-excavation samples were collected in September 2002 and February 2003, respectively, and analyzed for lead. The detected analytes from these samples are also included in Table 4-10. The data summary tables and validation summary are presented in Appendices C and D, respectively.

As presented in the following subsections, the groundwater sample analytical results for inorganic chemicals were compared to MCLs and the Zone E background concentration ranges. Organic compounds were compared to MCLs. For compounds where MCLs were not available, the EPA Region III RBC was used.

4.3.1 Inorganics in Groundwater

Arsenic and lead were detected in several samples at concentrations above their respective MCLs, as shown in Table 4-10. Detections of arsenic above its MCL were limited to a single monitoring well (E605GW003). Lead detections above its MCL (i.e., TTAL) were also to a

single location (well E605GW002 and its replacement well E605GW004). Based on the above information, arsenic and lead are identified as COPCs for groundwater and are discussed further in Section 5.0.

4.3.2 Organics in Groundwater

A review of the data presented in Table 4-11 showed that no organic compounds were detected above COPC screening criteria. Four dioxin congeners were detected and their TEQ values were calculated in accordance with EPA guidance (EPA, 1989). The calculated TEQ values were all below the MCL (for 2,3,7,8 TCDD) of 30 pg/L. Based on these data, no organic compounds are identified as COPCs in groundwater.

4.4 COPC Summary

Based on the data collected after the RFI, antimony, lead, and dieldrin are identified as COPCs in surface soil. Lead is identified as a COPC in subsurface soil. Arsenic and lead are identified as inorganic COPCs for shallow groundwater.

The presence of these constituents in groundwater is further discussed in Section 5.0.

TABLE 4-1

Detected Inorganic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)		SSL ^c (DAF=10)
							Residential	Industrial	
Aluminum	E621SB001	621SB00101	01/27/1999	2,120	=	261 - 20,500	7,800	200,000	NA
	E621SB002	621SB00201	01/27/1999	7,120	=				
	E621SB003	621SB00301	01/27/1999	6,380	=				
Antimony	E621SB001	621SB00101	01/27/1999	3.8	J	0.5 - 7.4	3	82	2.5
	E621SB002	621SB00201	01/27/1999	171	=				
	E621SB003	621SB00301	01/27/1999	106	=				
	E621SB004	621SB00401	01/27/1999	63.1	=				
Arsenic ^{ca}	E621SB002	621SB00201	01/27/1999	6.6	=	0.95 - 68	4	0.43	14.5
	E621SB003	621SB00301	01/27/1999	9.1	=				
Barium	E621SB001	621SB00101	01/27/1999	5.0	=	1.8 - 1,980	550	14,000	800
	E621SB002	621SB00201	01/27/1999	81.8	=				
	E621SB003	621SB00301	01/27/1999	46	=				
	E621SB004	621SB00401	01/27/1999	12	=				
Cadmium	E621SB001	621SB00101	01/27/1999	0.04	J	0.060 - 1.5	8	200	4
	E621SB002	621SB00201	01/27/1999	0.15	J				
	E621SB003	621SB00301	01/27/1999	0.12	J				
Chromium, Total	E621SB001	621SB00101	01/27/1999	6.5	J	2.3 - 567	12,000 _{II} /23 _{VI}	310,000 _{II} /610 _{VI}	19 _{VI}
	E621SB002	621SB00201	01/27/1999	26	J				
	E621SB003	621SB00301	01/27/1999	23.5	J				
	E621SB004	621SB00401	01/27/1999	9.4	J				
Cobalt	E621SB001	621SB00101	01/27/1999	3.5	=	0.35 - 111	470	12,000	NA
	E621SB002	621SB00201	01/27/1999	1.7	J				
	E621SB003	621SB00301	01/27/1999	2.1	J				
	E621SB004	621SB00401	01/27/1999	1.9	J				

TABLE 4-1

Detected Inorganic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)		SSL ^c (DAF=10)
							Residential	Industrial	
Copper	E621SB001	621SB00101	01/27/1999	4.7	J	0.47 - 866	310	8,200	NA
	E621SB002	621SB00201	01/27/1999	47.1	=				
	E621SB003	621SB00301	01/27/1999	46.3	=				
	E621SB004	621SB00401	01/27/1999	7.5	=				
Cyanide	E621SB001	621SB00101	01/27/1999	0.08	J	NA	160	4,100	20
Iron	E621SB001	621SB00101	01/27/1999	1,000	=	1,050 - 30,600	2,300	61,000	NA
	E621SB002	621SB00201	01/27/1999	9,250	=				
	E621SB003	621SB00301	01/27/1999	15,500	=				
	E621SB004	621SB00401	01/27/1999	2,760	=				
Lead	E621SB001	621SB00101	01/27/1999	1,000	J	1.0 - 400	400	1,218 ^d	1,472 ^e
	E621SB002	621SB00201	01/27/1999	129,000	J				
	E621SB003	621SB00301	01/27/1999	41,300	J				
	E621SB004	621SB00401	01/27/1999	15,700	J				
	E621SB005	621SB00501	07/28/1999	7.7	=				
	E621SB006	621SB00601	07/28/1999	16	=				
	E621SB007	621SB00701	07/28/1999	26,000	=				
	E621SB008	621SB00801	07/28/1999	19,000	=				
	E621SB009	621SB00901	07/28/1999	21,000	=				
	E621SB010	621SB01001	07/28/1999	16,000	=				
	E621SB012	621SB01201	07/28/1999	1,100	=				
	E621SB013	621SB01301	07/28/1999	16,000	=				
	E621SB014	621SB01401	07/28/1999	3,300	=				
	E621SB015	621SB01501	07/28/1999	110,000	=				
	E621SB016	621SB01601	07/28/1999	450	=				
	E621SB017	621SB01701	07/28/1999	2,400	=				

TABLE 4-1

Detected Inorganic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)		SSL ^c (DAF=10)
							Residential	Industrial	
Lead	E621SB018	621SB01801	07/28/1999	3,100	=	1.0 - 400	400	1,218 ^d	1,472 ^e
	E621SB019	621SB01901	07/28/1999	28,000	=				
	E621SB020	621SB02001	07/28/1999	420	=				
	E621SB022	621SB02201	07/28/1999	930	=				
	E621SB023	621SB02301	07/28/1999	11,000	=				
	E621SB024	621SB02401	07/28/1999	1,400	=				
	E621SB025	621SB02501	07/28/1999	1,700	=				
	E621SB026	621SB02601	07/28/1999	240	=				
	E621SB027	621SB02701	07/28/1999	750	=				
	E621SB028	621SB02801	07/28/1999	140	=				
Manganese	E621SB001	621SB00101	01/27/1999	7.6	=	0.93 - 508	160	4,100	NA
	E621SB002	621SB00201	01/27/1999	55	=				
	E621SB003	621SB00301	01/27/1999	60.9	=				
	E621SB004	621SB00401	01/27/1999	9.4	=				
Mercury	E621SB001	621SB00101	01/27/1999	0.06	=	0.030 - 2.7	2.3 ^f	61 ^f	1
	E621SB002	621SB00201	01/27/1999	1	=				
	E621SB003	621SB00301	01/27/1999	0.34	=				
	E621SB004	621SB00401	01/27/1999	0.95	=				
Nickel	E621SB001	621SB00101	01/27/1999	2.7	J	0.60 - 72	160	4,100	16,225 ^e
	E621SB002	621SB00201	01/27/1999	7.1	=				
	E621SB003	621SB00301	01/27/1999	7.6	=				
	E621SB004	621SB00401	01/27/1999	1.7	J				
Potassium	E621SB002	621SB00201	01/27/1999	618	=	46 - 2,620	NA/EN	NA/EN	NA
	E621SB003	621SB00301	01/27/1999	1,280	=				
Silver	E621SB002	621SB00201	01/27/1999	2.2	=	0.75 - 0.91	39	1,000	17
	E621SB003	621SB00301	01/27/1999	2.0	=				

TABLE 4-1

Detected Inorganic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)		SSL ^c (DAF=10)
							Residential	Industrial	
Silver	E621SB004	621SB00401	01/27/1999	0.42	J	0.75 - 0.91	39	1,000	17
Tin (Sn)	E621SB001	621SB00101	01/27/1999	6.8	J	0.77 - 45	4,700	120,000	NA
	E621SB002	621SB00201	01/27/1999	16.9	J				
	E621SB003	621SB00301	01/27/1999	19.6	=				
	E621SB004	621SB00401	01/27/1999	12	J				
Vanadium	E621SB001	621SB00101	01/27/1999	2.3	=	1.1 - 60	55	1,400	3,000
	E621SB002	621SB00201	01/27/1999	16.7	=				
	E621SB003	621SB00301	01/27/1999	22.6	=				
	E621SB004	621SB00401	01/27/1999	1.8	J				
Zinc	E621SB001	621SB00101	01/27/1999	14.2	=	1.9 - 855	2,300	61,000	6,000
	E621SB002	621SB00201	01/27/1999	56.3	=				
	E621SB003	621SB00301	01/27/1999	47.7	=				
	E621SB004	621SB00401	01/27/1999	10.7	=				

Values in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001).

^b Industrial Risk-Based Concentration (RBC) from the U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) of 10, except where otherwise indicated.

^{ca} indicates that the compound is considered a carcinogen for the calculation of the RBC.

^d Adult Lead Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use (CH2M-Jones, 2001).

^e Site-specific SSL presented in the Phase II Interim Measure Work Plan for Combined SWMU 5, Zone E, Revision 0 (CH2M-Jones, 2002).

^f Mercuric chloride used as a surrogate.

iii RBC based on trivalent chromium (Cr⁺³).

vi RBC based on hexavalent chromium (Cr⁺⁶).

NA indicates that the information is not available or not applicable.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 4-2

Detected Organic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Sitewide Reference Concentration ^a	RBC ^b (HI=0.1)		SSL ^c (DAF=10)
							Residential	Industrial	
Volatile Organic Compounds									
Acetone	E621SB001	621SB00101	01/27/1999	0.007	=	NA	780	20,000	0.8
Semivolatile Organic Compounds									
Benzo(a)Anthracene ^{ca}	E621SB002	621SB00201	01/27/1999	0.067	J	NA	0.87	7.8	1
	E621SB003	621SB00301	01/27/1999	0.040	J				
	E621SB004	621SB00401	01/27/1999	0.064	J				
Benzo(a)Pyrene ^{ca}	E621SB002	621SB00201	01/27/1999	0.075	J	NA	0.087	0.78	4
Benzo(b)Fluoranthene ^{ca}	E621SB002	621SB00201	01/27/1999	0.12	J	NA	0.87	7.8	2.5
	E621SB003	621SB00301	01/27/1999	0.062	J				
	E621SB004	621SB00401	01/27/1999	0.15	J				
Benzo(k)Fluoranthene ^{ca}	E621SB002	621SB00201	01/27/1999	0.14	J	NA	8.7	78	24.5
	E621SB003	621SB00301	01/27/1999	0.083	J				
	E621SB004	621SB00401	01/27/1999	0.12	J				
Benzoic acid	E621SB002	621SB00201	01/27/1999	0.33	J	NA	31,000	82,000	200
	E621SB003	621SB00301	01/27/1999	0.30	J				
	E621SB004	621SB00401	01/27/1999	0.17	J				
Benzyl Butyl Phthalate	E621SB001	621SB00101	01/27/1999	0.086	J	NA	1,600	41,000	465
bis(2-Ethylhexyl) Phthalate ^{ca}	E621SB002	621SB00201	01/27/1999	0.76	J	NA	46	410	1,800
Chrysene ^{ca}	E621SB002	621SB00201	01/27/1999	0.13	J	NA	87	780	80
	E621SB003	621SB00301	01/27/1999	0.071	J				
	E621SB004	621SB00401	01/27/1999	0.1	J				
Di-n-butyl Phthalate	E621SB002	621SB00201	01/27/1999	0.093	J	NA	780	20,000	1,150
	E621SB004	621SB00401	01/27/1999	0.05	J				
Fluoranthene	E621SB002	621SB00201	01/27/1999	0.16	J	NA	310	8,200	2,150
	E621SB003	621SB00301	01/27/1999	0.11	J				

TABLE 4-2

Detected Organic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Sitewide Reference Concentration ^a	RBC ^b (HI=0.1)		SSL ^c (DAF=10)
							Residential	Industrial	
Fluoranthene	E621SB004	621SB00401	01/27/1999	0.11	J	NA	310	8,200	2,150
Phenanthrene	E621SB002	621SB00201	01/27/1999	0.072	J	NA	NA	NA	NA
	E621SB003	621SB00301	01/27/1999	0.06	J				
	E621SB002	621SB00201	01/27/1999	0.25	J	NA	230	6,100	2,100
Pyrene	E621SB003	621SB00301	01/27/1999	0.15	J				
	E621SB004	621SB00401	01/27/1999	0.14	J				
BEQs	E621SB001	621SB00101	01/27/1999	0.428	U	1.304	NA	NA	NA
	E621SB002	621SB00201	01/27/1999	0.31	=				
	E621SB003	621SB00301	01/27/1999	0.4	=				
	E621SB004	621SB00401	01/27/1999	0.411	=				
Pesticides									
Dieldrin ^{ca}	E621SB001	621SB00101	01/27/1999	0.0021	=	NA	0.04	0.36	0.002
Endrin Aldehyde	E621SB001	621SB00101	01/27/1999	0.043	J	NA	2.3	61	0.5
Gamma-chlordane ^{ca}	E621SB001	621SB00101	01/27/1999	0.0016	=	NA	1.8	16	5
p,p'-DDD ^{ca}	E621SB003	621SB00301	01/27/1999	0.36	=	NA	2.7	24	8
p,p'-DDE ^{ca}	E621SB001	621SB00101	01/27/1999	0.0018	=	NA	1.9	17	27
	E621SB003	621SB00301	01/27/1999	0.24	=				
p,p'-DDT ^{ca}	E621SB001	621SB00101	01/27/1999	0.02	J	NA	1.9	17	16
	E621SB002	621SB00201	01/27/1999	2.6	=				
	E621SB003	621SB00301	01/27/1999	5.9	=				
	E621SB004	621SB00401	01/27/1999	0.53	=				

^a Background PAHs Study Report, Technical Information for Development of Background BEQ Values (CH2M-Jones, 2001).

^b Industrial Risk Based Concentration (RBC) from the U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) of 10 (1 for VOCs).

^{ca} Compound is considered a carcinogen.

NA indicates that the information is not available or not applicable.

TABLE 4-2

Detected Organic Compounds in Surface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Sitewide Reference Concentration ^a	RBC ^b (HI=0.1)		SSL ^c ¹ DAF=10)
							Residential	Industrial	
J	indicates that the compound was detected. The reported value is the estimated concentration of the compound.								
=	indicates that the compound was detected. The reported value is the concentration of the compound.								

TABLE 4-3

Detected Inorganic Compounds in Subsurface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (DAF=10)
Aluminum	E621SB001	621SB00102	01/27/1999	12,300	=	1,220 - 29,900	NA
	E621SB002	621SB00202	01/27/1999	22,000	=		
	E621SB003	621SB00302	01/27/1999	13,600	=		
Antimony	E621SB002	621SB00202	01/27/1999	2.6	J	0.52 - 1.6	2.5
	E621SB003	621SB00302	01/27/1999	4.5	J		
Arsenic	E621SB001	621SB00102	01/27/1999	7.5	=	0.83 - 26	14.5
	E621SB002	621SB00202	01/27/1999	8.2	=		
	E621SB003	621SB00302	01/27/1999	6.9	=		
Barium	E621SB001	621SB00102	01/27/1999	29.2	=	6.1 - 91	800
	E621SB002	621SB00202	01/27/1999	41.7	=		
	E621SB003	621SB00302	01/27/1999	25.3	=		
Beryllium	E621SB001	621SB00102	01/27/1999	0.49	J	0.15 - 1.6	31.5
	E621SB002	621SB00202	01/27/1999	0.84	=		
	E621SB003	621SB00302	01/27/1999	0.39	J		
Cadmium	E621SB001	621SB00102	01/27/1999	0.1	J	0.13 - 0.96	4
	E621SB002	621SB00202	01/27/1999	0.09	J		
	E621SB003	621SB00302	01/27/1999	1.5	J		
Calcium	E621SB001	621SB00102	01/27/1999	12,200	=	323 - 229,000	NA
Chromium, Total	E621SB001	621SB00102	01/27/1999	20.7	J		
	E621SB002	621SB00202	01/27/1999	32.4	J		
Cobalt	E621SB003	621SB00302	01/27/1999	24.8	J	0.41 - 15	NA
	E621SB001	621SB00102	01/27/1999	2.7	J		
	E621SB002	621SB00202	01/27/1999	5.4	=		
Copper	E621SB003	621SB00302	01/27/1999	2.5	J	1.3 - 192	NA
	E621SB001	621SB00102	01/27/1999	11.2	=		
	E621SB002	621SB00202	01/27/1999	22.7	=		
Cyanide	E621SB003	621SB00302	01/27/1999	20.3	=	NA	20
	E621SB001	621SB00102	01/27/1999	0.09	J		
	E621SB003	621SB00302	01/27/1999	0.07	J		

TABLE 4-3

Detected Inorganic Compounds in Subsurface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (DAF=10)
Iron	E621SB001	621SB00102	01/27/1999	13,600	=	924 - 35,800	NA
	E621SB002	621SB00202	01/27/1999	22,800	=		
	E621SB003	621SB00302	01/27/1999	12,200	=		
Lead	E621SB001	621SB00102	01/27/1999	36.7	J	1.8 - 322	1,472
	E621SB002	621SB00202	01/27/1999	1,320	J		
	E621SB003	621SB00302	01/27/1999	2,210	J		
	E621SB005	621SB00502	07/28/1999	22	=		
	E621SB006	621SB00602	07/28/1999	19	=		
	E621SB007	621SB00702	07/28/1999	2,900	=		
	E621SB008	621SB00802	07/28/1999	950	=		
	E621SB009	621SB00902	07/28/1999	4,700	=		
	E621SB010	621SB01002	07/28/1999	1,200	=		
	E621SB012	621SB01202	07/28/1999	530	=		
	E621SB013	621SB01302	07/28/1999	2,600	=		
	E621SB014	621SB01402	07/28/1999	420	=		
	E621SB015	621SB01502	07/28/1999	2,900	=		
	E621SB016	621SB01602	07/28/1999	230	=		
	E621SB017	621SB01702	07/28/1999	170	=		
	E621SB018	621SB01802	07/28/1999	1,000	=		
	E621SB019	621SB01902	07/28/1999	4,400	=		
	E621SB020	621SB02002	07/28/1999	120	=		
	E621SB022	621SB02202	07/28/1999	290	=		
	E621SB023	621SB02302	07/28/1999	660	=		
	E621SB024	621SB02402	07/28/1999	45	=		
	E621SB025	621SB02502	07/28/1999	670	=		
	E621SB026	621SB02602	07/28/1999	120	=		
	E621SB027	621SB02702	07/28/1999	37	=		
	E621SB028	621SB02802	07/28/1999	13	=		

TABLE 4-3

Detected Inorganic Compounds in Subsurface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (DAF=10)
Magnesium	E621SB001	621SB00102	01/27/1999	1,790	=	77 - 9,140	NA
	E621SB002	621SB00202	01/27/1999	2,640	=		
	E621SB003	621SB00302	01/27/1999	1,150	=		
Manganese	E621SB001	621SB00102	01/27/1999	104	=	4.9 - 625	NA
	E621SB002	621SB00202	01/27/1999	80	=		
	E621SB003	621SB00302	01/27/1999	59	=		
Mercury	E621SB001	621SB00102	01/27/1999	0.21	=	0.04 - 0.9	1
	E621SB002	621SB00202	01/27/1999	0.13	=		
	E621SB003	621SB00302	01/27/1999	0.16	=		
Nickel	E621SB001	621SB00102	01/27/1999	8.2	=	0.85 - 20	16,225
	E621SB002	621SB00202	01/27/1999	10.5	=		
	E621SB003	621SB00302	01/27/1999	7.9	=		
Potassium	E621SB001	621SB00102	01/27/1999	836	=	106 - 3,440	NA
	E621SB002	621SB00202	01/27/1999	1,520	=		
	E621SB003	621SB00302	01/27/1999	703	=		
Selenium	E621SB002	621SB00202	01/27/1999	0.59	J	0.59 - 2.4	2.5
	E621SB003	621SB00302	01/27/1999	0.64	J		
Tin (Sn)	E621SB001	621SB00102	01/27/1999	4.4	J	2.8 - 24	NA
	E621SB002	621SB00202	01/27/1999	6	J		
	E621SB003	621SB00302	01/27/1999	6.1	J		
Vanadium	E621SB001	621SB00102	01/27/1999	28.9	=	1.6 - 71	3,000
	E621SB002	621SB00202	01/27/1999	50.7	=		
	E621SB003	621SB00302	01/27/1999	29.9	=		
Zinc	E621SB001	621SB00102	01/27/1999	58	=	5.8 - 438	6,000
	E621SB002	621SB00202	01/27/1999	99.8	=		
	E621SB003	621SB00302	01/27/1999	380	=		

Values in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) of 10.

TABLE 4-3

Detected Inorganic Compounds in Subsurface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (DAF=10)
NA	indicates that the information is not available or not applicable.						
J	indicates that the compound was detected. The reported value is the estimated concentration of the compound.						
=	indicates that the compound was detected. The reported value is the concentration of the compound.						

TABLE 4-4

Detected Organic Compounds in Subsurface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Sitewide Reference Concentration ^a	SSL ^b (DAF=10)
Volatile Organic Compounds							
Acetone	E621SB001	621SB00102	01/27/1999	0.063	=	NA	0.8
	E621SB002	621SB00202	01/27/1999	0.086	=		
	E621SB003	621SB00302	01/27/1999	0.07	=		
Semivolatile Organic Compounds							
Acenaphthene	E621SB001	621SB00102	01/27/1999	0.051	J	NA	285
Anthracene	E621SB001	621SB00102	01/27/1999	0.041	J	NA	6,000
Benzo(a)Anthracene	E621SB001	621SB00102	01/27/1999	0.06	J	NA	1
	E621SB002	621SB00202	01/27/1999	0.054	J		
	E621SB003	621SB00302	01/27/1999	0.052	J		
Benzo(a)Pyrene	E621SB001	621SB00102	01/27/1999	0.049	J	NA	4
	E621SB002	621SB00202	01/27/1999	0.064	J		
	E621SB003	621SB00302	01/27/1999	0.052	J		
Benzo(b)Fluoranthene	E621SB001	621SB00102	01/27/1999	0.062	J	NA	2.5
	E621SB002	621SB00202	01/27/1999	0.049	J		
	E621SB003	621SB00302	01/27/1999	0.054	J		
Benzo(k)Fluoranthene	E621SB001	621SB00102	01/27/1999	0.058	J	NA	24.5
	E621SB002	621SB00202	01/27/1999	0.071	J		
	E621SB003	621SB00302	01/27/1999	0.061	J		
Chrysene	E621SB001	621SB00102	01/27/1999	0.079	J	NA	80
	E621SB002	621SB00202	01/27/1999	0.067	J		
	E621SB003	621SB00302	01/27/1999	0.084	J		

TABLE 4-4

Detected Organic Compounds in Subsurface Soil Samples from AOC 621 Investigation (1999)

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Sitewide Reference Concentration ^a	SSL ^b (DAF=10)
Fluoranthene	E621SB001	621SB00102	01/27/1999	0.17	J	NA	2,150
	E621SB002	621SB00202	01/27/1999	0.12	J		
	E621SB003	621SB00302	01/27/1999	0.15	J		
Phenanthrene	E621SB001	621SB00102	01/27/1999	0.054	J	NA	NA
	E621SB002	621SB00202	01/27/1999	0.056	J		
Pyrene	E621SB001	621SB00102	01/27/1999	0.17	J	NA	2,100
	E621SB002	621SB00202	01/27/1999	0.11	J		
	E621SB003	621SB00302	01/27/1999	0.16	J		
BEQs	E621SB001	621SB00102	01/27/1999	0.265	=	1.4	NA
	E621SB002	621SB00202	01/27/1999	0.334	=		
	E621SB003	621SB00302	01/27/1999	0.3	=		
Pesticides							
p,p'-DDD	E621SB003	621SB00302	01/27/1999	0.014	J	NA	8
p,p'-DDE	E621SB003	621SB00302	01/27/1999	0.0047	J	NA	27
p,p'-DDT	E621SB002	621SB00202	01/27/1999	0.0036	=	NA	16
	E621SB003	621SB00302	01/27/1999	0.1	=		

^a Background PAHs Study Report, Technical Information for Development of Background BEQ Values (CH2M-Jones, 2001).

^b U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) of 10 (1 for VOCs).

NA indicates that the information is not available or not applicable.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 4-5

Detected Inorganic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)	SSL ^c (Site-Specific)
Lead	E005SB004	005SB00401	11/13/01	670	=	1.0 - 400	1,218	1,427
	E005SB005	005SB00501	11/13/01	480	=			
	E005SB006	005SB00601	11/13/01	440	=			
	E005SB007	005SB00701	11/13/01	670	=			
	E005SB008	005SB00801	11/13/01	1,900	=			
	E005SB009	005SB00901	11/13/01	720	=			
	E005SB010	005SB01001	11/13/01	6,900	=			
	E005SB011	005SB01101	11/13/01	910	=			
	E005SB012	005SB01201	11/15/01	7,000	=			
	E005SB013	005SB01301	11/15/01	4.3	=			
	E005SB014	005SB01401	11/15/01	15,000	=			
	E005SB015	005SB01501	11/15/01	160	=			
	E005SB016	005SB01601	11/15/01	840	=			
	E005SB017	005SB01701	11/15/01	260	=			
	E005SB018	005SB01801	11/14/01	100	=			
	E005SB019	005SB01901	11/14/01	160	=			
	E005SB021	005SB02101	11/14/01	750	=			
	E005SB022	005SB02201	11/14/01	1,400	=			
	E005SB023	005SB02301	11/14/01	1,400	=			
	E005SB024	005SB02401	11/15/01	1,900	=			
	E005SB025	005SB02501	11/15/01	700	=			
	E005SB026	005SB02601	11/15/01	980	=			
	E005SB027	005SB02701	11/15/01	400	=			
	E005SB028	005SB02801	11/15/01	110	=			

TABLE 4-5

Detected Inorganic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)	SSL ^c (Site-Specific)
Lead	E005SB029	005SB02901	11/14/01	170	=	1.0 - 400	1,218	1,427
	E005SB030	005SB03001	11/14/01	1,900	=			
	E005SB032	005SB03201	11/14/01	930	=			
	E005SB033	005SB03301	11/14/01	490	=			
	E005SB034	005SB03501	11/19/01	44	=			
	E005SB034	005SB03401	11/15/01	9.9	=			
	E005SB036	005SB03601	11/15/01	92	=			
	E005SB048	005SB04801	11/16/01	7,600	=			
	E005SB049	005SB04901	11/16/01	6,300	=			
	E005SB050	005SB05001	11/16/01	8.2	=			
	E005SB051	005SB05101	11/16/01	8,900	=			
	E005SB052	005SB05201	02/21/02	80	J			
	E005SB053	005SB05301	02/21/02	2,500	J			
	E005SB054	005SB05401	02/21/02	42	J			
	E005SB055	005SB05501	02/21/02	16,000	J			
	E005SB056	005SB05601	02/21/02	6,900	J			
	E005SB059	005SB05901	02/21/02	150,000	J			
Nickel	E005SB021	005SB02101	11/14/01	95	=	0.6 - 72	4,100	36,716
	E005SB022	005SB02201	11/14/01	46	=			
	E005SB023	005SB02301	11/14/01	79	=			
	E005SB024	005SB02401	11/15/01	59	=			
	E005SB025	005SB02501	11/15/01	120	=			
	E005SB026	005SB02601	11/15/01	120	=			
	E005SB027	005SB02701	11/15/01	34	=			

TABLE 4-5

Detected Inorganic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	RBC ^b (HI=0.1)	SSL ^c (Site-Specific)
Nickel	E005SB028	005SB02801	11/15/01	7.4	J	0.6 - 72	4,100	36,716
	E005SB029	005SB02901	11/14/01	25	=			
	E005SB030	005SB03001	11/14/01	110	=			
	E005SB032	005SB03201	11/14/01	41	=			
	E005SB033	005SB03301	11/14/01	18	=			
	E005SB034	005SB03501	11/19/01	5.9	J			
	E005SB034	005SB03401	11/15/01	2.9	J			
	E005SB036	005SB03601	11/15/01	7.4	J			
	E005SB052	005SB05201	02/21/02	6.3	J			
	E005SB057	005SB05701	02/21/02	250	=			
	E005SB058	005SB05801	02/21/02	73	=			

Values in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, Revision 1A, (CH2M-Jones, December 2001).

^b Industrial Risk-Based Concentration (RBC) from the U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c Site-specific Soil Screening Levels (SSLs) presented in the Phase II IM Work Plan for Combined SWMU 5 (CH2M-Jones, 2002).

NA indicates that the information is not available or not applicable.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 4-6

Detected Organic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/kg}$)	Qualifier	Sitewide Reference Concentration	RBC ^a (HI=0.1)	SSL ^b (DAF=10)
Pesticides								
Alpha-chlordane	E005SB032	005SB03201	11/14/01	0.66	J	NA	16,000	5,000
	E005SB034	005SB03501	11/19/01	0.84	J			
	E005SB036	005SB03601	11/15/01	6.8	J			
Dieldrin	E005SB032	005SB03201	11/14/01	3.5	J	NA	360	2
	E005SB034	005SB03501	11/19/01	0.55	J			
	E005SB036	005SB03601	11/15/01	0.39	J			
	E005SB037	005SB03701	11/13/01	0.55	J			
Endosulfan II	E005SB032	005SB03201	11/14/01	1.3	J	NA	1,200,000	9,000
	E005SB037	005SB03701	11/13/01	0.61	J			
Endrin Aldehyde	E005SB036	005SB03601	11/15/01	0.67	J	NA	61,000	500
Gamma-chlordane	E005SB032	005SB03201	11/14/01	0.68	J	NA	16,000	5,000
	E005SB033	005SB03301	11/14/01	1.4	=			
	E005SB034	005SB03501	11/19/01	1.4	J			
	E005SB036	005SB03601	11/15/01	15	=			
Heptachlor Epoxide	E005SB037	005SB03701	11/13/01	2.5	J			
	E005SB032	005SB03201	11/14/01	0.81	J	NA	630	350
	E005SB033	005SB03301	11/14/01	0.49	J			
	E005SB038	005SB03801	11/14/01	2.6	J			
p,p'-DDD	E005SB034	005SB03501	11/19/01	4.1	J	NA	24,000	8,000
	E005SB036	005SB03601	11/15/01	0.68	J			
	E005SB037	005SB03701	11/13/01	3.4	J			
p,p'-DDE	E005SB038	005SB03801	11/14/01	29	J			
	E005SB032	005SB03201	11/14/01	13	=	NA	17,000	27,000
	E005SB033	005SB03301	11/14/01	2.3	J			

TABLE 4-6

Detected Organic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/kg}$)	Qualifier	Sitewide Reference Concentration	RBC ^a (HI=0.1)	SSL ^b (DAF=10)
p,p'-DDE	E005SB034	005SB03501	11/19/01	4.2	J	NA	17,000	27,000
	E005SB036	005SB03601	11/15/01	2.1	J			
	E005SB037	005SB03701	11/13/01	9.6	=			
	E005SB038	005SB03801	11/14/01	12	J			
p,p'-DDT	E005SB032	005SB03201	11/14/01	34	J	NA	17,000	16,000
	E005SB033	005SB03301	11/14/01	8.8	J			
	E005SB034	005SB03501	11/19/01	2.6	J			
	E005SB036	005SB03601	11/15/01	1	J			
	E005SB037	005SB03701	11/13/01	14	J			
	E005SB038	005SB03801	11/14/01	11	J			
Semivolatile Organic Compounds								
Acenaphthene	E005SB039	005SB03901	11/13/01	340	J	NA	12,000,000	285,000
Benzo(a)Anthracene	E005SB039	005SB03901	11/13/01	56	J	NA	7,800	1,000
	E005SB040	005SB04001RE	11/13/01	110	J			
Benzo(a)Pyrene	E005SB039	005SB03901	11/13/01	43	J	NA	780	4,000
	E005SB040	005SB04001RE	11/13/01	100	J			
Benzo(b)Fluoranthene	E005SB039	005SB03901	11/13/01	63	J	NA	7,800	2,500
Benzo(g,h,i)Perylene	E005SB040	005SB04001RE	11/13/01	57	J	NA	NA	NA
Benzo(k)Fluoranthene	E005SB040	005SB04001RE	11/13/01	210	J	NA	78,000	24,500
Chrysene	E005SB039	005SB03901	11/13/01	63	J	NA	780,000	80,000
	E005SB040	005SB04001RE	11/13/01	100	J			
Flouranthene	E005SB039	005SB03901	11/13/01	430	=	NA	8,200,000	2,150,000
	E005SB040	005SB04001RE	11/13/01	560	J			
	E005SB041	005SB04101	11/13/01	350	J			
Fluorene	E005SB039	005SB03901	11/13/01	340	J	NA	8,200,000	280,000

TABLE 4-6

Detected Organic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/kg}$)	Qualifier	Sitewide Reference Concentration	RBC ^a (HI=0.1)	SSL ^b (DAF=10)
Phenanthrene	E005SB040	005SB04001RE	11/13/01	39	J	NA	NA	NA
Pyrene	E005SB039	005SB03901	11/13/01	84	J	NA	6,100,000	2,100,000
	E005SB040	005SB04001RE	11/13/01	160	J			
BEQs	E005SB039	005SB03901	11/13/01	277.0	J	1,304 ^c	780	NA
	E005SB040	005SB04001RE	11/13/01	386.2	J			
	E005SB041	005SB04101	11/13/01	439.3	J			

^a Industrial Risk Based Concentration (RBC) from the U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^b U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) of 10.

^c Background PAHs Study Report, Technical Information for Development of Background BEQ Values, Charleston Naval Complex, CH2M-Jones, Revision 0, February 2001.

NA indicates that the information is not available or not applicable.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 4-7

Detected Inorganic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (Site-Specific)
Lead	E005SB004	005SB00402	11/13/01	92	=	1.8 – 322	1,427
	E005SB005	005SB00502	11/13/01	200	=		
	E005SB006	005SB00602	11/13/01	140	=		
	E005SB007	005SB00702	11/13/01	140	=		
	E005SB008	005SB00802	11/13/01	7.6	=		
	E005SB009	005SB00902	11/13/01	350	=		
	E005SB010	005SB01002	11/13/01	200	=		
	E005SB011	005SB01102	11/13/01	74	=		
	E005SB012	005SB01202	11/15/01	620	=		
	E005SB013	005SB01302	11/15/01	700	=		
	E005SB014	005SB01402	11/15/01	120	=		
	E005SB015	005SB01502	11/15/01	470	=		
	E005SB016	005SB01602	11/15/01	14	=		
	E005SB018	005SB01802	11/14/01	90	=		
	E005SB019	005SB01902	11/14/01	77	=		
	E005SB021	005SB02102	11/14/01	960	=		
	E005SB022	005SB02202	11/14/01	16	=		
	E005SB023	005SB02302	11/14/01	19	=		
	E005SB024	005SB02402	11/15/01	86	=		
	E005SB025	005SB02502	11/15/01	37	=		
	E005SB026	005SB02602	11/15/01	51	=		
	E005SB027	005SB02702	11/15/01	1.3	=		
	E005SB028	005SB02802	11/15/01	5.6	=		
	E005SB029	005SB02902	11/14/01	21	=		

TABLE 4-7

Detected Inorganic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (Site-Specific)
Lead	E005SB030	005SB03002	11/14/01	300	=	1.8 – 322	1,427
	E005SB032	005SB03202	11/14/01	830	=		
	E005SB033	005SB03302	11/14/01	550	=		
	E005SB035	005SB03502	11/19/01	52	=		
	E005SB036	005SB03602	11/15/01	52	=		
	E005SB048	005SB04802	11/16/01	2,700	=		
	E005SB049	005SB04902	11/16/01	200	=		
	E005SB050	005SB05002	11/16/01	2,100	=		
	E005SB051	005SB05102	11/16/01	2,200	=		
	E005SB052	005SB05202	02/21/02	38	=		
	E005SB053	005SB05302	02/21/02	24	=		
	E005SB054	005SB05402	02/21/02	3.7	=		
	E005SB055	005SB05502	02/21/02	5,700	=		
	E005SB056	005SB05602	02/21/02	370	=		
	E005SB059	005SB05902	02/21/02	840	=		
	E005SB060	005SB06003	09/05/02	540	=		
	E005SB061	005SB06103	09/05/02	820	=		
	E005SB062	005SB06203	09/05/02	1,100	=		
	E005SB063	005SB06303	09/05/02	930	=		
	E005SB064	005SB06403	09/05/02	4,600	=		
	E005SB065	005SB06503	10/16/02	245	=		
	E005SB069	005SB06903	10/16/02	570	=		
	E005SB070	005SB07003	10/16/02	329	=		
	E005SB071	005SB071N1	01/09/03	19.9	=		

TABLE 4-7

Detected Inorganic Compounds in Surface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL ^b (Site-Specific)
Nickel	E005SB021	005SB02102	11/14/01	68	=	0.85 – 20	36,716
	E005SB024	005SB02402	11/15/01	9.6	=		
	E005SB025	005SB02502	11/15/01	9.8	=		
	E005SB026	005SB02602	11/15/01	13	=		
	E005SB027	005SB02702	11/15/01	14	=		
	E005SB028	005SB02802	11/15/01	1.4	J		
	E005SB030	005SB03002	11/14/01	25	=		
	E005SB033	005SB03302	11/14/01	18	=		
	E005SB035	005SB03502	11/19/01	9.5	=		
	E005SB036	005SB03602	11/15/01	4.9	J		
	E005SB052	005SB05202	02/21/02	5.7	J		
	E005SB057	005SB05702	02/21/02	36	=		
	E005SB058	005SB05802	02/21/02	29	=		

Values in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

^a *Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^b Site-specific Soil Screening Levels (SSLs) presented in the Phase II IM Work Plan for Combined SWMU 5 (CH2M-Jones, 2002).

NA indicates that the information is not available or not applicable.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 4-8

Detected Organic Compounds in Subsurface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/kg}$)	Qualifier	Sitewide Reference Concentration	SSL ^a (DAF=10)
Pesticides							
Dieldrin	E005SB032	005SB03202	11/14/01	0.33	J	NA	2
	E005SB033	005SB03302	11/14/01	0.48	J		
	E005SB035	005SB03502RE	11/19/01	0.56	J		
Endosulfan II	E005SB033	005SB03302	11/14/01	0.46	J	NA	9,000
Gamma-chlordane	E005SB032	005SB03202	11/14/01	0.29	J	NA	5,000
	E005SB033	005SB03302	11/14/01	1.7	=		
	E005SB036	005SB03602	11/15/01	2.4	J		
p,p'-DDD	E005SB036	005SB03602	11/15/01	2.8	=	NA	8,000
p,p'-DDE	E005SB032	005SB03202	11/14/01	0.7	J	NA	27,000
	E005SB033	005SB03302	11/14/01	1.4	J		
	E005SB035	005SB03502RE	11/19/01	0.87	J		
	E005SB036	005SB03602	11/15/01	4	=		
p,p'-DDT	E005SB032	005SB03202	11/14/01	4	J	NA	16,000
	E005SB033	005SB03302	11/14/01	11	J		
	E005SB035	005SB03502RE	11/19/01	0.91	J		
Semivolatile Organic Compounds							
Acenaphthene	E005SB039	005SB03902	11/13/01	370	J	NA	285,000
	E005SB040	005SB04002RE	11/13/01	320	J		
	E005SB041	005SB04102	11/13/01	380	J		
Benzo(a)Anthracene	E005SB040	005SB04002RE	11/13/01	130	J	NA	1,000
Benzo(a)Pyrene	E005SB040	005SB04002RE	11/13/01	120	J	NA	4,000
Benzo(b)Fluoranthene	E005SB040	005SB04002RE	11/13/01	200	J	NA	2,500
Benzo(k)Fluoranthene	E005SB040	005SB04002RE	11/13/01	71	J	NA	24,500
Chrysene	E005SB040	005SB04002RE	11/13/01	99	J	NA	80,000
Flouranthene	E005SB039	005SB03902	11/13/01	420	J	NA	2,150,000
	E005SB040	005SB04002RE	11/13/01	510	J		
	E005SB041	005SB04102	11/13/01	460	=		
Fluorene	E005SB039	005SB03902	11/13/01	370	J	NA	280,000
	E005SB041	005SB04102	11/13/01	390	J		

TABLE 4-8

Detected Organic Compounds in Subsurface Soil Samples from Post-RFI Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/kg}$)	Qualifier	Sitewide Reference Concentration	SSL ^a (DAF=10)
Phenanthrene	E005SB039	005SB03902	11/13/01	43	J	NA	NA
	E005SB040	005SB04002RE	11/13/01	53	J		
	E005SB041	005SB04102	11/13/01	28	J		
Pyrene	E005SB040	005SB04002RE	11/13/01	180	J	NA	2,100,000
BEQs	E005SB039	005SB03902	11/13/01	508.4	U	1,400 ^b	NA
	E005SB040	005SB04002RE	11/13/01	352.8	J		
	E005SB041	005SB04102	11/13/01	520	U		

^a U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) of 10.

^b Background PAHs Study Report, Technical Information for Development of Background BEQ Values (CH2M-Jones, February 2001).

NA indicates that the information is not available or not applicable.

U indicates that the compound was not detected. The reported value is the detection limit.

UU indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 4-9

Intermediate Interval Sample Lead Analytical Results

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Concentration (mg/kg)	Qualifier	SSL
E005SB060	005SB06003	540	=	1,427
E005SB061	005SB06103	820	=	
E005SB062	005SB06203	1,100	=	
E005SB063	005SB06303	930	=	
E005SB064	005SB06403	4,600	=	

Notes: Bold and boxed value exceeds the site-specific SSL of 1,218 mg/kg.

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
Aluminum	E018GW001	018GW00103a	10/28/96	169	J	1,220 - 29,900	NA	3,700
		018GW00104a	01/07/97	74.7	J			
	E018GW002	018GW00203b	10/28/96	21.6	J			
	E605GW001	605GW00102	07/01/96	339	=			
		605GW00103	10/28/96	184	J			
		605GW00104	01/07/97	192	J			
	E605GW002	605GW00203	10/28/96	115	J			
		605GW00204	01/07/97	892	=			
	E605GW003	605GW00303	10/28/96	116	J			
		605GW00304	01/08/97	42.2	J			
Arsenic	E018GW001	018GW00102a	07/01/96	3.4	J	0.83 – 26	50	NA
		018GW00103a	10/28/96	2.7	J			
		018GW001L2	12/05/01	5.21	J			
	E018GW002	018GW00203b	10/28/96	2.7	J			
	E605GW001	605GW00102	07/01/96	11.5	=			
		605GW00103	10/28/96	11.1	=			
		605GW00104	01/07/97	10.1	J			
	E605GW002	605GW00202	07/02/96	11.7	=			
		605GW00203	10/28/96	5.4	J			
		605GW00204	01/07/97	4.3	J			
	E605GW003	605GW00302	07/02/96	85.5	=			
		605GW00303	10/28/96	48.9	=			
		605GW00304	01/08/97	82.7	J			
	E605GW004	605GW004L2	12/05/01	6.98	J			
	E605GW005	605GW005L2	12/05/01	8.91	J			
	E605GW006	605GW006L2	12/05/01	4.97	J			

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
Barium	E018GW001	018GW00103a	10/28/96	53.5	J	6.1 – 91	2,000	NA
		018GW00104a	01/07/97	34	J			
		018GW001L2	12/05/01	85.8	J			
	E018GW002	018GW00203b	10/28/96	274	=			
		018GW00204a	01/07/97	265	=			
		018GW002L2	12/05/01	423	=			
	E605GW001	605GW00103	10/28/96	47.4	J			
		605GW00104	01/07/97	45.1	J			
	E605GW002	605GW00203	10/28/96	75.3	J			
		605GW00204	01/07/97	77.5	J			
	E605GW003	605GW00303	10/28/96	75.2	J			
		605GW00304	01/08/97	105	J			
	E605GW006	605GW006L2	12/05/01	158	J			
Cadmium	E018GW001	018GW00102a	07/01/96	2.5	J	1.4	5	NA
Calcium	E018GW001	018GW00102a	07/01/96	86,400	=	1,170 - 260,000	NA/EN	NA/EN
		018GW00103a	10/28/96	16,900	=			
		018GW00104a	01/07/97	30,900	=			
	E018GW002	018GW00202a	07/01/96	118,000	=			
		018GW00203b	10/28/96	90,200	=			
		018GW00204a	01/07/97	94,000	=			
	E605GW001	605GW00102	07/01/96	43,700	=			
		605GW00103	10/28/96	50,800	=			
		605GW00104	01/07/97	53,200	=			
	E605GW002	605GW00202	07/02/96	84,900	=			
		605GW00203	10/28/96	63,400	=			
		605GW00204	01/07/97	70,400	=			
	E605GW003	605GW00302	07/02/96	86,100	=			

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
Calcium		605GW00303	10/28/96	77,800	=	1,170 - 260,000	NA/EN	NA/EN
		605GW00304	01/08/97	96,400	=			
Chromium (Total)	E018GW001	018GW00103a	10/28/96	1.2	J	0.8 – 31	100	NA
		018GW00104a	01/07/97	1.5	J			
	E605GW003	605GW00303	10/28/96	2.6	J			
		605GW00304	01/08/97	0.98	J			
	E605GW004	605GW004L2	12/05/01	7.98	J			
Cobalt	E605GW002	605GW00204	01/07/97	1.2	J	0.9 – 44	NA	220
Iron	E018GW001	018GW00102a	07/01/96	431	=	144 - 76,600	NA	1,100
		018GW00103a	10/28/96	86	J			
		018GW00104a	01/07/97	37.6	J			
	E018GW002	018GW00202a	07/01/96	16,900	=			
		018GW00203b	10/28/96	12,500	=			
		018GW00204a	01/07/97	12,900	J			
	E605GW001	605GW00102	07/01/96	9,650	=			
		605GW00103	10/28/96	10,600	=			
		605GW00104	01/07/97	11,000	J			
	E605GW002	605GW00202	07/02/96	28,200	=			
		605GW00203	10/28/96	8,180	=			
		605GW00204	01/07/97	16,400	J			
	E605GW003	605GW00302	07/02/96	7,850	=			
		605GW00303	10/28/96	5,020	=			
		605GW00304	01/08/97	9,420	J			
Lead	E018GW001	018GW001L2	12/05/01	5.58	=	2 – 47	15 _{TOTAL}	NA
	E605GW002	605GW00202	07/02/96	68.6	=			
		605GW00203	10/28/96	404	=			
		605GW00204	01/07/97	1,970	=			

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/L}$)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
Lead	E605GW004	605GW004L2	12/05/01	21.4	=	2 – 47	15 _{TOTAL}	NA
		605GW004M1	09/05/02	15	=			
		605GW004RN1	02/28/03	3.1	J			
	E605GW005	605GW005L2	12/05/01	4.63	=			
		605GW005M1	09/05/02	7	=			
	E605GW006	605GW006L2	12/05/01	3.77	=			
		605GW006RN1 (filtered)	02/28/03	5.63	=			
Magnesium	E018GW001	018GW00102a	07/01/96	169,000	=	790 - 1,160,000	NA/EN	NA/EN
		018GW00103a	10/28/96	1,450	J			
		018GW00104a	01/07/97	67,900	=			
	E018GW002	018GW00202a	07/01/96	6,360	=			
		018GW00203b	10/28/96	8,550	=			
		018GW00204a	01/07/97	7,270	=			
	E605GW001	605GW00102	07/01/96	23,500	=			
		605GW00103	10/28/96	26,700	=			
		605GW00104	01/07/97	28,500	=			
	E605GW002	605GW00202	07/02/96	15,300	=			
		605GW00203	10/28/96	19,800	=			
		605GW00204	01/07/97	6,280	=			
	E605GW003	605GW00302	07/02/96	12,100	=			
		605GW00303	10/28/96	11,600	=			
		605GW00304	01/08/97	11,900	=			
Manganese	E018GW001	018GW00102a	07/01/96	96.7	=	2 - 2,650	NA	73
		018GW00103a	10/28/96	10.8	J			
		018GW00104a	01/07/97	21.9	J			
	E018GW002	018GW00202a	07/01/96	419	=			

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
Manganese	E605GW001	018GW00203b	10/28/96	278	=	2 - 2,650	NA	73
		018GW00204a	01/07/97	314	J			
		605GW00102	07/01/96	33.7	=			
		605GW00103	10/28/96	49.3	=			
		605GW00104	01/07/97	46.9	J			
	E605GW002	605GW00202	07/02/96	262	=			
		605GW00203	10/28/96	152	=			
		605GW00204	01/07/97	180	J			
	E605GW003	605GW00302	07/02/96	228	=			
		605GW00303	10/28/96	169	=			
Mercury	E018GW001	018GW001L2	12/05/01	0.145	J	0.14 - 0.6	2	NA
	E018GW001	018GW00102a	07/01/96	7.3	J			
Nickel	E605GW002	605GW00202	07/02/96	5.9	J	0.9 - 17	NA	73
		605GW00204	01/07/97	6.7	J			
Potassium	E018GW001	018GW00102a	07/01/96	47,700	=	1,320 - 289,000	NA/EN	NA/EN
		018GW00104a	01/07/97	32,300	=			
	E018GW002	018GW00203b	10/28/96	5,920	=			
		018GW00204a	01/07/97	4,770	J			
	E605GW001	605GW00102	07/01/96	13,900	=			
		605GW00103	10/28/96	15,200	=			
		605GW00104	01/07/97	15,300	=			
	E605GW002	605GW00203	10/28/96	10,600	=			
		605GW00204	01/07/97	6,060	=			
	E605GW003	605GW00303	10/28/96	10,600	=			
		605GW00304	01/08/97	9,550	=			
Sodium	E018GW001	018GW00102a	07/01/96	1,390,000	=	NA	NA/EN	NA/EN

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
Sodium	E018GW002	018GW00103a	10/28/96	7,260	=	NA	NA/EN	NA/EN
		018GW00104a	01/07/97	463,000	J			
		018GW00203b	10/28/96	20,400	=			
		018GW00204a	01/07/97	20,100	J			
	E605GW001	605GW00102	07/01/96	130,000	=			
		605GW00103	10/28/96	120,000	=			
		605GW00104	01/07/97	107,000	J			
		605GW00202	07/02/96	132,000	=			
	E605GW002	605GW00203	10/28/96	197,000	=			
		605GW00204	01/07/97	38,600	J			
		605GW00303	10/28/96	55,600	=			
		605GW00304	01/08/97	40,400	J			
Tin (Sn)	E605GW003	605GW00303	10/28/96	3.7	J	3 – 10	NA	2,200
Vanadium	E605GW001	605GW00104	01/07/97	0.63	J	0.6 – 26	NA	28
	E605GW002	605GW00204	01/07/97	0.72	J			
	E605GW003	605GW00304	01/08/97	0.59	J			
Zinc	E018GW001	018GW00102a	07/01/96	373	=	5 – 141	NA	1,100
		018GW00103a	10/28/96	130	=			
		018GW00104a	01/07/97	117	=			
	E605GW002	605GW00202	07/02/96	61.9	=			
		605GW00203	10/28/96	44.7	=			
		605GW00204	01/07/97	75.5	=			

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001).

^b U.S. EPA National Primary Drinking Water Standards (3/2001).

^c U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

TABLE 4-10

Detected Inorganic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/L}$)	Qualifier	Zone E Range of Background Concentrations ^a	MCL ^b	RBC ^c (HI = 0.1)
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J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TTAL Treatment Technique Action Level.

TABLE 4-11

Detected Organic Compounds from Post-RFI Groundwater Sampling

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Compound	Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/L}$)	Qualifier	MCL ^a	RBC ^b (HI=0.1)
Semivolatile Organic Compounds ($\mu\text{g/L}$)							
Acenaphthene	E605GW001	605GW00102	07/01/96	5	J	NA	37
	E605GW003	605GW00302	07/02/96	5	J		
Dioxins (pg/L)							
1,2,3,4,6,7,8-Heptachlorodibenzofuran	E605GW001	605GW00102	07/01/96	5.9	EMPC	NA	NA
	E605GW002	605GW00202	07/02/96	4.26	EMPC		
	E605GW003	605GW00302	07/02/96	3.28	EMPC		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	E605GW003	605GW00302	07/02/96	3.55	EMPC	NA	NA
Octachlorodibenzofuran	E605GW001	605GW00102	07/01/96	3.67	EMPC	NA	NA
	E605GW002	605GW00202	07/02/96	5.12	EMPC		
	E605GW003	605GW00302	07/02/96	6.69	EMPC		
Octachlorodibenzo-p-dioxin	E605GW001	605GW00102	07/01/96	22.6	EMPC	NA	NA
	E605GW002	605GW00202	07/02/96	16.8	EMPC		
	E605GW003	605GW00302	07/02/96	20.5	EMPC		
TEQs	E605GW001	605GW00102	07/01/96	0.085	EMPC	30 ^c	NA
	E605GW002	605GW00202	07/02/96	0.065	EMPC		
	E605GW003	605GW00302	07/02/96	0.095	EMPC		

^a U.S. EPA National Primary Drinking Water Standards (3/2001).

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c MCL is for 2,3,7,8-TCDD.

U indicates that the compound was not detected. The reported value is the detection limit.

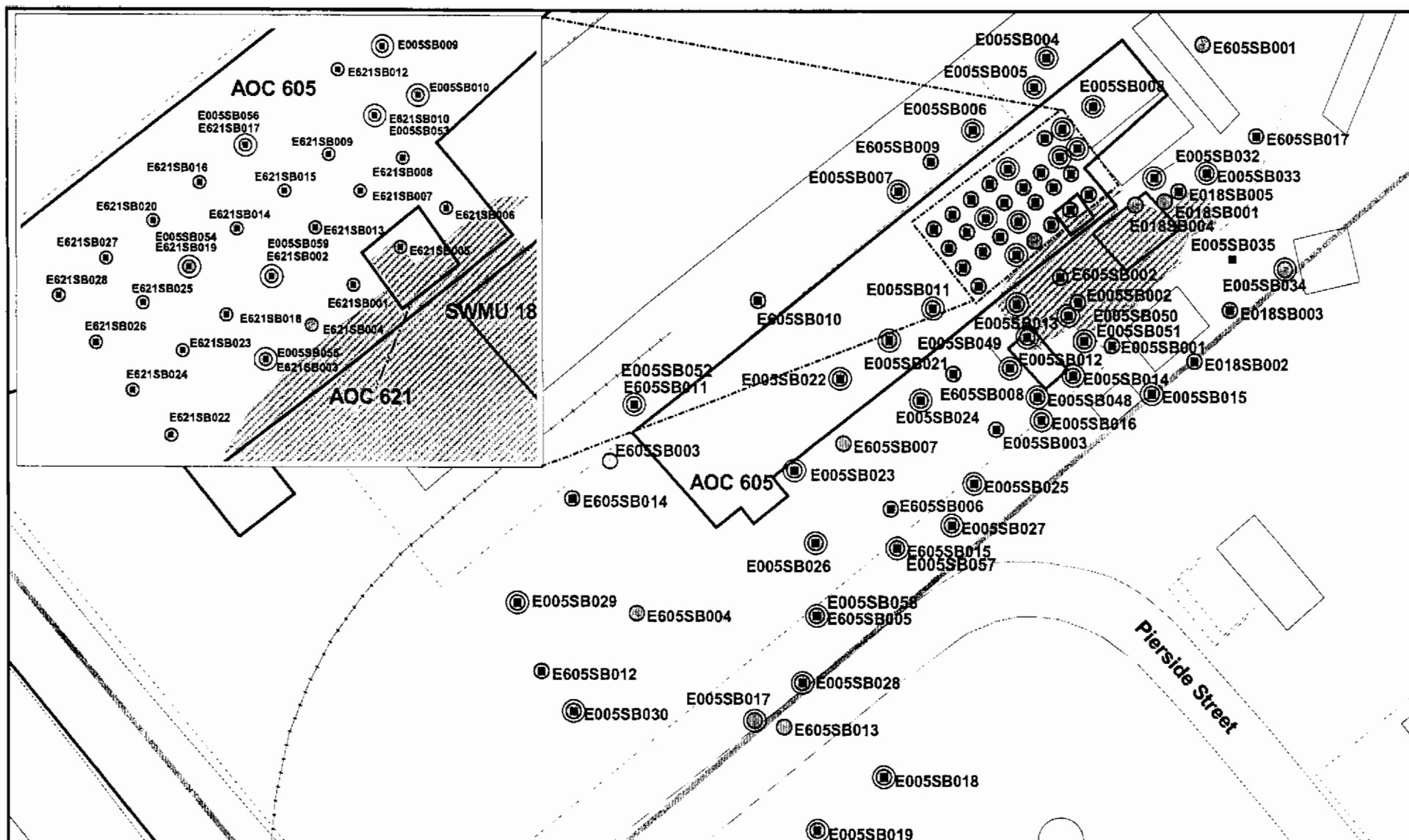
UU indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

pg/L Picograms per liter

EMPC estimated maximum possible concentration.



- Subsurface Soil Samples
- Surface Soil Samples
- ⊗ CH2M - Jones Soil Samples
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary
- ▨ IM Excavation Area (1998)
- ▭ AOC Boundary

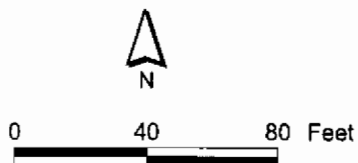
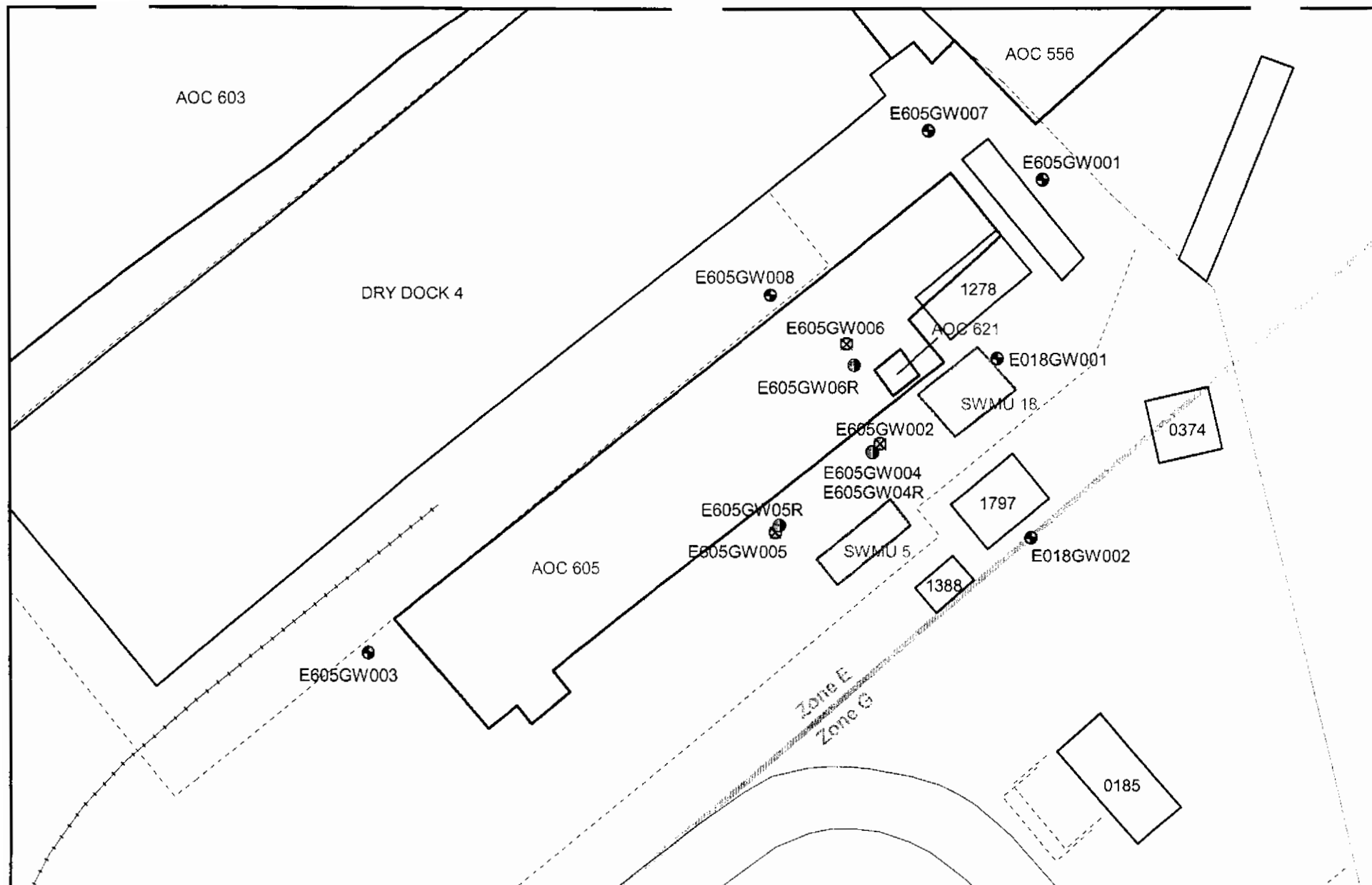


Figure 4-1
Soil Sample Locations
AOCs 605 & 621, and SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL



- | | |
|--------------------------------|----------------------------|
| ● Active Groundwater Well | --- Shoreline |
| ○ Replacement Groundwater Well | --- AOC Boundary - Active |
| ⊗ Abandoned Groundwater Well | --- AOC Boundary - NFA |
| --- Railroads | --- SWMU Boundary - Active |
| --- Fence | --- Buildings |
| --- Roads | --- Zone Boundary |

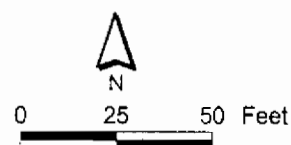


Figure 4-2
Groundwater Well Locations
AOCs 605 & 621 and SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

1 **5.0 COPC/COC Refinement**

2 The *Zone E RFI Report, Revision 0* (EnSafe, 1997) identified antimony, arsenic, BEQs,
3 beryllium, copper, and lead as COCs in surface soil under the unrestricted (i.e., residential)
4 land use scenario at Combined SWMU 5. Under the industrial land use scenario, arsenic,
5 BEQs, and beryllium were identified as surface soil COCs. Antimony, arsenic, dioxins, and
6 lead were identified in the RFI report as COCs for site groundwater.

7 Based on the additional sampling as described in Section 4.0, antimony, lead, and dieldrin
8 are identified as COPCs in surface soil. Lead is identified as a COPC in subsurface soil.
9 Arsenic and lead are identified as inorganic COPCs for shallow groundwater.

10 Most of the elevated concentration areas with lead, and other metals presented in Section 4.0
11 have been excavated as part of the IM implementation, as discussed in Sections 3 and 7.
12 Tables 5-3 to 5-11 present the residual concentrations of individual chemicals identified as
13 COPCs prior to IM-implementation that are evaluated in this section.

14 The BCT has agreed to rescreen soil VOC data using generic SSLs based on a DAF=1. The
15 results of this rescreening are presented below. The nature of occurrence and the relevance
16 of COPCs at the site are also discussed below.

17 This section also describes the relevant results of the IMs conducted by the DET and CH2M-
18 Jones to remediate previously identified COCs, and discusses the data to assess whether
19 post-remediation residual concentrations at the site are protective of human health and the
20 environment. During the IMs, clean soil brought in from offsite replaced the contaminated
21 soil removed during the IMs. A reassessment of soil contamination was made by replacing
22 the results of the removed samples with analytical results of the clean fill material.

23 Because of the area of the site and the spatial distribution of the site samples, the site was
24 divided into three exposure areas. Each exposure area has an area of approximately ½-acre,
25 to represent exposure units for potential human exposures. The exposure point
26 concentrations (EPCs) are estimated separately for COPCs identified in these exposure units
27 as discussed in the individual COPC discussions below.

28 Figure 5-1 shows the sample locations and the boundaries of the individual IM excavations.
29 The exposure areas are shown on Figure 5-2.

5.1 Soil VOC Rescreening using DAF=1

VOC detections surface and subsurface soil are summarized in Tables 5-1 and 5-2, respectively. Inspection of these tables indicates that no VOCs were detected above their respective SSLs. Thus, no VOCs are identified as COCs for soil at this site.

5.2 Surface Soil COCs

5.2.1 Antimony

Antimony was identified as a surface soil COC for the unrestricted (i.e., residential) land use scenario in the *Zone E RFI Report, Revision 0*. Two surface soil samples (at borings E621SB002 and E621SB003) contained antimony at concentrations that exceed its industrial RBC (82 mg/kg with a HI=0.1). These boring locations were removed during the IM conducted by CH2M-Jones at SWMU 5. The insert for Figure 5-1 shows the locations of these soil borings within the excavation footprint. As presented in Table 5-3, no residual soil containing antimony above its industrial RBC remains at the site. The maximum residual concentration at the site is 26 mg/kg, below the industrial RBC of 82 mg/kg (HI = 0.1).

The 95% Upper Confidence Limit (UCL₉₅) values, based on residual soil samples and replaced soil concentrations, of 19.5, 5.7, and 16.1 mg/kg, were determined for antimony for the three half-acre exposure units, as shown in Appendix F. These UCL₉₅ values are below the industrial RBC of 82 mg/kg (HI=0.1) but exceed the residential RBC of 3.1 mg/kg (HI=0.1). On this basis, antimony is not considered a surface soil COC for the industrial land use scenario.

The maximum detected value and all three UCL₉₅ concentrations of antimony are below the residential RBC of 31 mg/kg at an HI=1.0. Antimony has toxic effects that impact longevity and blood. The ratio of the EPCs to the RBC (HI = 1.0) ranges from 0.18 to 0.63. No other COPCs at this site have the same target organs for toxicity as antimony. Thus cumulative health effects are not an issue and a RBC based on a HI = 1.0 can be used as a comparative value for determining whether antimony is a COC for unrestricted land use, based on human exposure concerns. Because the EPCs are all below the residential RBC (HI = 1.0), antimony is not considered a COC for the unrestricted land use scenario.

Twelve residual surface soil samples contained antimony above its generic SSL (2.5 mg/kg) based on a DAF of 10, which is below the Zone E background level. The average (mean) residual antimony concentrations for surface soil for the three exposure areas are 6.1 mg/kg,

3.1 mg/kg, and 9.9 mg/kg, respectively. Each of these exceeds the generic SSL (DAF=10) of 2.5 mg/kg.

Site-specific SSLs were calculated for antimony, per previous BCT agreements. The site-specific values for antimony for the unpaved and paved scenarios are 1.6 mg/kg and 17.6 mg/kg, respectively. On this basis, antimony would not be considered a soil COC for the paved land use scenario.

The unpaved site-specific SSL is well below the Zone E maximum background range for antimony (7.4 mg/kg), as are the mean values for two of the exposure areas. Groundwater data indicate that antimony is not a groundwater COC, as is further discussed in Section 5.3. Antimony was detected above its MCL in the first round of groundwater samples collected from E605GW002 and E605GW003. However, antimony was not detected in the samples collected from these monitoring wells in the three subsequent sampling efforts, nor was it detected in any site monitoring wells after the first sampling event.

Much of the site is either paved, or includes unpaved remediated areas where pavement was removed during the IMs. Thus these areas do not contain antimony at concentrations that would represent a leaching concern. Based on the lack of antimony in groundwater, and the significant removal of antimony in soil as part of the IMs, antimony in surface soil does not appear to represent a leaching hazard, and therefore is not considered a COC for leachability.

5.2.2 Arsenic

Arsenic was identified as a COC in the *Zone E RFI Report, Revision 0* based on exceedances of its residential and industrial RBCs in surface soil. Residual site arsenic concentrations in surface soil are presented in Table 5-4. UCL₉₅ values for remaining arsenic concentrations in surface soil were calculated for each of the three half-acre exposure areas. These values were calculated as 9 mg/kg, 0.95 mg/kg, and 19 mg/kg. Appendix F presents the UCL₉₅ calculation results and arsenic soil concentrations.

Background soils at the CNC have been shown to have concentrations of arsenic above both the EPA Region III residential and industrial RBCs. Arsenic concentrations detected in background (grid) soil samples in Zone E ranged from 0.95 to 68 mg/kg, with a mean concentration of 8.5 mg/kg.

For sites where background arsenic levels exceed residential RBCs, EPA Region IV typically considers arsenic concentrations in surface soil of up to 20 mg/kg and 270 mg/kg as acceptable for unrestricted and industrial land use, respectively (EPA, 2001). None of the

1 site residual arsenic concentrations exceed the 20 mg/kg. Therefore, based on EPA Region
2 IV guidance, arsenic would not be considered a COC under the unrestricted or industrial
3 land use scenarios.

4 **5.2.3 Beryllium**

5 Beryllium was identified as a COC in the *Zone E RFI Report, Revision 0* based on exceedances
6 of its industrial RBC of 1.3 mg/kg. Table 5-5 for presents a summary of concentrations of
7 beryllium in soil where concentrations range between less than 0.01 to 3.7 mg/kg.
8 Subsequent to submission of the RFI report, EPA revised the beryllium industrial and
9 residential RBCs. The current residential and industrial RBCs are 16 and 410 mg/kg,
10 respectively (HI = 0.1). Based on comparison of site concentrations to the current RBCs,
11 beryllium does not exceed either its residential or industrial RBC in any surface soil sample.
12 Beryllium concentrations are all within the Zone E range of background concentrations.
13 Therefore, beryllium is not identified as a surface soil COC at Combined SWMU 5.

14 **5.2.4 Copper**

15 Copper was identified as a COC in the *Zone E RFI Report, Revision 0* based on exceedances of
16 its residential RBC of 310 mg/kg and industrial RBC of 8200 mg/kg (HI=0.1). The residual
17 copper levels, as presented in Table 5-6, range between 3.8 mg/kg and 1900 mg/kg. The
18 range of background copper levels in Zone E is from 0.47 mg/kg to 866 mg/kg. The generic
19 SSL (DAF=10) is 5,500 mg/kg.

20 None of the residual copper concentrations exceeded the industrial RBC or the SSL. Only
21 the residential RBC at HI of 0.1 (310 mg/kg) was exceeded in three samples (E605SB007,
22 E605SB012 and E605SB015). None of the residual concentrations exceeded the residential
23 RBC of 3100 mg/kg (HI = 1.0).

24 The target organ identified for toxicity of copper is the GI tract, for which copper causes
25 irritation. No other COPC at combined SWMU 5 also targets the GI tract for toxicity. Thus
26 cumulative health effects are not an issue and a RBC based on a HI = 1.0 can be used as a
27 comparative value for determining whether copper is a COC for unrestricted land use,
28 based on human exposure concerns. The UCL₉₅ estimations for copper default to the
29 maximum detected concentration due to small sample size per exposure unit. The
30 maximum residual copper values are below the HI=1.0 based residential RBC of 3,100
31 mg/kg.

32 Therefore, copper is not identified as a surface soil COC at Combined SWMU 5 for
33 leachability or the industrial or unrestricted land use scenarios.

5.2.5 Lead

Soil impacted by lead was targeted for removal during the IMs conducted by the DET and CH2M-Jones. The extent of the excavation is shown in Figure 5-1. The goal of the IM conducted by CH2M-Jones was to reduce lead concentrations to levels protective of industrial workers (1,218 mg/kg in surface soil) and shallow groundwater (site-specific SSL of 1,472 mg/kg in surface and subsurface soil). Section 7.0 of this report further describes the implementation of this IM.

In order to evaluate whether the residual lead concentrations in soil are below the health-based target levels, EPCs were calculated for the post-IM lead concentrations in soil for the three half-acre exposure areas. EPCs were calculated as average (mean) lead values. Lead values for clean fill were used as replacement lead values for the excavated soil samples. Table 5-6 summarizes the residual lead concentrations used for these calculations. Appendix F presents the lead data and the calculated exposure concentration for each of the three exposure areas.

EPC (mean) values for lead for the three areas were calculated as 317 mg/kg, 677 mg/kg, and 423 mg/kg for the northeast, central, and southwest exposure areas, respectively. The exposure concentrations within each of the three exposure units are below the industrial site-specific RBC (1,218 mg/kg) and the site-specific SSL (1,472 mg/kg). Residual lead concentrations are considered adequately protective of industrial workers and shallow groundwater. Therefore, lead is not identified as a surface soil COC under the industrial land use scenario at Combined SWMU 5.

However, because the mean concentrations in the exposure areas exceed the typical residential cleanup level of 400 mg/kg, lead is considered a surface soil COC for the unrestricted land use scenario. A site-specific exposure evaluation could be conducted at a future time when unrestricted land use is considered for this area to determine whether the remaining lead concentrations are adequately protective for the unrestricted land use.

5.2.6 BEQs

BEQs were identified as COCs in the *Zone E RFI Report, Revision 0* based on exceedances of the industrial RBC of 780 µg/kg. Subsequent to the RFI, CH2M-Jones evaluated the sitewide background concentrations of cPAHs (BEQs). The findings of this evaluation were presented in the *Background PAHs Study Report, Technical Information for Development of Background BEQ Values* (CH2M-Jones, 2001). A site-wide reference concentration for BEQs of 1,304 µg/kg for surface soil was proposed and subsequently adopted by the BCT.

Calculated BEQ concentrations in surface soil at SWMU 5 are below the site-wide reference concentration adopted by the BCT except in four samples (018SB00401, 1,650 $\mu\text{g}/\text{kg}$; 605SB004, 6,201 $\mu\text{g}/\text{kg}$; 605SB01301, 1,370 $\mu\text{g}/\text{kg}$; and 605SB01401, 1,350 $\mu\text{g}/\text{kg}$; see Table 5-8). The locations of these residual samples are shown in Figure 5-1.

Because of the BEQ exceedances of the site-wide reference concentrations, BEQs are retained as surface soil COCs for the unrestricted and industrial land use scenarios.

5.2.7 Dieldrin

Dieldrin was identified as a COPC based on four samples that contained dieldrin above its generic SSL. Residual dieldrin concentrations are provided in Table 5-9. No surface soil samples contained dieldrin above its industrial RBC of 360 $\mu\text{g}/\text{kg}$ or residential RBC of 40 $\mu\text{g}/\text{kg}$. Thus, dieldrin would not be considered a COC for the industrial or unrestricted land use scenarios.

Mean dieldrin concentrations were calculated for exposure areas (northeast and southwest) that had exceedances of the SSL. Calculated mean concentrations for both areas were 1.8 $\mu\text{g}/\text{kg}$ (see Appendix E), which is below the generic SSL (DAF=10) of 2 $\mu\text{g}/\text{kg}$. This indicates that dieldrin is not expected to impact shallow groundwater. Additionally, dieldrin has not been detected in site groundwater, further indicating that existing concentrations of dieldrin are adequately protective of shallow groundwater. Thus, dieldrin is not considered a soil COC for leachability concerns.

5.3 Subsurface Soil COCs

The *Zone E RFI Report, Revision 0* did not identify subsurface soil COCs at the Combined SWMU 5 site. Antimony and lead were identified in Section 4.0 of this report as COPCs based on exceedances of their SSLs in subsurface soil. The presence of antimony and lead in subsurface soil is evaluated further below to determine if they are considered COCs under current practices at the CNC.

5.3.1 Antimony

Antimony has been detected at concentrations above its generic SSL in 11 of 20 subsurface soil samples. Table 5-10 presents residual antimony concentrations in subsurface soil. The mean antimony concentrations in remaining subsurface soil for the three exposure areas are calculated as 3.3 mg/kg, 2.5 mg/kg, and 11.15 mg/kg. Two of these mean values exceed antimony's generic SSL. Site-specific SSLs for the unpaved and paved scenarios of 1.6 and

17.6 mg/kg, respectively, were calculated for antimony. Based on these values, antimony would not be a soil COC for the paved land use scenario.

For the unpaved land use scenario, the site-specific SSL indicates that antimony in subsurface soil may present a leachability concern. However the groundwater data indicate that antimony is not a groundwater COC. As further discussed in Section 5.3, antimony was detected above its MCL in the first round of groundwater samples collected from E605GW002 and E605GW003, prior to IM-implementation. However, antimony was not detected in the samples collected from these monitoring wells in the three subsequent sampling efforts.

Much of the site is paved and the unpaved areas include clean-fill soil due to the IM implemented in those areas. Thus, these areas do not contain antimony at concentrations that would represent a leaching concern. Based on the lack of antimony in groundwater, antimony in soil does not appear to represent a leaching hazard, and therefore is not considered a subsurface soil COC.

5.3.2 Lead

Residual lead concentrations were evaluated to assess the current potential leachability of lead from remaining soil. Analytical results for sample locations that were removed during the IM were replaced with the results from the fill material. Table 5-11 presents residual lead concentrations in subsurface soil, which ranged between 1.3 to 5,700 mg/kg. Mean lead concentrations were calculated for the subsurface soil in exposure areas (northeast and central) that had at least one residual lead concentration greater than the site-specific SSL of 1,472 mg/kg. Appendix E contains the data that were used in the average concentration calculation.

The mean lead concentrations for the northeast and central half-acre exposure areas were calculated to be 489 and 300 mg/kg, respectively. These concentrations are below the site-specific SSL of 1,427 mg/kg. None of the remaining lead concentrations in the southeast exposure area exceeded the site-specific SSL of 1,472 mg/kg. Therefore, lead is not identified as a subsurface soil COC at Combined SWMU 5.

5.4 Summary of Soil COCs

Based on the above discussion, BEQs are identified as surface soil COCs for the unrestricted and industrial land use scenarios. Lead is retained as a COC in surface soil for the unrestricted land use scenario. No subsurface COCs were identified.

5.5 Groundwater COCs

The HHRA in the *Zone E RFI Report, Revision 0* for Combined SWMU 5 identified antimony, arsenic, lead, and dioxin equivalents as contributing to elevated risk/HI based on residential reuse of the site. Lead was also detected above its TTAL. As discussed in Section 4.0, arsenic and lead were identified as COPCs in groundwater as a result of the sampling conducted after the RFI report was submitted. These COPCs are evaluated further below to determine if they are considered COCs.

5.5.1 Antimony

Antimony was identified as a COPC based on the analytical results from the first round of RFI samples collected. It was detected in three of the five monitoring wells, with two samples (065GW00201, 6.6 µg/L and 065GW00301, 6.2 µg/L) containing antimony concentrations that exceeded its MCL of 6 µg/L. Antimony was not detected in any sample from the subsequent three sampling events. Antimony data for all groundwater samples collected at Combined SWMU 5 are presented in Table 5-11. Based on these data, antimony concentrations are currently below its MCL and it is not identified as a COC.

5.5.2 Arsenic

Arsenic was detected above its MCL of 50 µg/L in the second and fourth rounds of samples collected from monitoring well E605GW003. Table 5-12 presents all arsenic data in groundwater samples collected at Combined SWMU 5. The location of monitoring well E605GW003 is outside and to the southwest of AOC 605. This location is hydraulically upgradient of the Combined SWMU 5 sites and no information was found that suggests that site activities were performed in this area.

Table 5-12 also shows the iron concentrations for the groundwater samples from Combined SWMU 5. It can be seen that the two groundwater samples from well E605GW003 that had arsenic exceedances of the MCL also had iron concentrations that exceeded 1,000 µg/L. Iron concentrations above 1,000 µg/L are considered by EPA to be indicative of iron-reducing conditions in an aquifer. As discussed in a memorandum previously provided to SCDHEC (*Draft Technical Memorandum: A Discussion of the Occurrence of Arsenic in Background Groundwater at the CNC* [CH2M-Jones, 2002]), naturally occurring iron reducing conditions at the CNC appear to be related to the presence of arsenic in some groundwater above 50 µg/L. The detections of arsenic above 50 µg/L are concluded to be related to natural background conditions and not site-related. Thus, arsenic is not considered a COC in groundwater at this site.

5.5.3 Lead

Lead was identified as a groundwater COC in the *Zone E RFI Report, Revision 0*, based on exceedances of its MCL in monitoring well E605GW002 (the TTAL for lead was used as the MCL). Lead concentrations consistently exceeded its MCL in samples collected in 1996 and 1997 from monitoring well E605GW002. Table 5-13 presents all lead data in the groundwater samples collected at Combined SWMU 5.

In 1998 the DET completed an IM which targeted soil containing lead concentrations greater than 1,300 mg/kg. Monitoring well E605GW002 was abandoned at the time of the DET's IM, and monitoring well E605GW004 was subsequently installed at the location of E605GW002 as a replacement for the abandoned well.

The first sample (post-IM) collected from E605GW004 in 2001 contained lead at a concentration of 21.4 µg/L, which is above its MCL, but significantly less than any of the pre-IM samples collected from E605GW002. These data suggest that lead concentrations in site groundwater were declining as a result of removal activities at the site.

In September 2002, at the request of SCDHEC, a second sample was collected from monitoring well E605GW004 (and E605GW005). The lead concentration (15 µg/L) in the 2002 sample from E605GW004 did not exceed the MCL, further indicating that soil removal activities at SWMU 5 were positively impacting shallow groundwater quality.

SCDHEC requested that monitoring wells E605GW004, E605GW005, and E605GW006 be sampled again following the 2002/2003 soil IM conducted by CH2M-Jones. Both filtered and unfiltered samples were collected in February 2003. The analytical results for these samples, which are presented in Table 5-13, show that all results were below the TTAL (i.e., MCL) for lead of 15 µg/L.

The groundwater data support the conclusions of the evaluation of the soil data that remaining concentrations of lead in soil do not present a threat to shallow groundwater. Additionally, groundwater data indicate that lead concentrations have declined to below lead's TTL as a result of removal activities at the site. Because lead concentrations in groundwater are below the TTAL, lead is not considered a groundwater COC at Combined SWMU 5.

5.5.4 Dioxin Equivalents (TEQs)

Dioxin equivalents were identified in the *Zone E RFI Report, Revision 0* as contributing to site risk based on a calculated TEQ value (62.6 pg/L) in the duplicate sample from monitoring well E605GW003 that exceeds the tap water RBC (0.45 pg/L). As a result of these data, the

1 next sampling effort included collecting four samples from the three site monitoring wells
2 and analyzing them for dioxins. The calculated TEQs for these samples were all below the
3 tap-water RBC. Table 5-14 presents the calculated TEQ values and Appendix G presents the
4 TEQ calculation.

5 All reported dioxin congeners in the duplicate sample were reported with the qualifier
6 "EMPC" (estimated maximum possible concentration). This qualifier places significant
7 doubt on the usability of these data. The EMPC qualifier indicates that either the dioxin
8 congeners were detected in a blank sample or there was interference in the sample matrix.
9 In either case the dioxin congener may not have been present in the sample and the reported
10 value was the concentration of the interferant.

11 Because the original sample collected from monitoring well E605GW003 as well as
12 subsequent samples had calculated TEQ values below MCL of 30 pg/L, the calculated TEQ
13 concentration from the first sampling event appears to be anomalous or the result of matrix
14 interference. Therefore, dioxin equivalents are not identified as groundwater COCs at
15 Combined SWMU 5. Based on the above discussions, no groundwater COCs are identified
16 at Combined SWMU 5.

TABLE 5-1

Detected VOCs in Surface Soil RFI Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Date Collected	Concentration (mg/kg)	Qualifier	SSL ^a (DAF=1)
Acetone	E605SB003	09/21/95	0.044	=	0.8
	E605SB004	09/21/95	0.18	=	
	E605SB008	09/22/95	0.041	=	
	E605SB011	09/21/95	0.16	=	
	E605SB010	09/21/95	0.04	=	
Dichlorofluoromethane	E605SB010	09/21/95	0.007	J	0.55 ^b
Methyl ethyl ketone (2-Butanone)	E605SB004	09/21/95	0.030	=	0.4 ^b

^a U.S. EPA Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) 1.

^b EPA Region III RBC Table (EPA, October, 2000)

= indicates that the compound was detected. The reported value is the concentration of the compound.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

TABLE 5-2

Detected VOCs in Subsurface Soil RFI Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Date Collected	Concentration (mg/kg)	Qualifier	SSL ^a (DAF=1)
Acetone	E605SB008	09/22/1995	0.045	=	0.8
	E605SB006	09/22/1995	0.054	=	
	E005SB003	09/22/1995	0.099	=	
	E605SB011	09/21/95	0.017	=	
	E605SB012	05/31/96	0.048	J	
	E605SB015	05/31/96	0.17	J	
Dichlorofluoromethane	E605SB011	09/21/95	0.006	J	0.55 ^b

^a U.S. EPA Region Soil Screening Guidance: Technical Background Document (5/1996) based on a dilution-attenuation factor (DAF) 1.

^b EPA Region III RBC Table (EPA, October, 2000)

= indicates that the compound was detected. The reported value is the concentration of the compound.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

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TABLE 5-3

Antimony Residual Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID		Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI=0.1) ^b	SSL (DAF=10) ^c
E605SB017	605SB01701		NE	17-Sep-96	1.2	J	0.5 - 7.4	82	2.5
E621SB001	621SB00101	r	NE	27-Jan-99	0.86	=			
E621SB002	621SB00201	r	NE	27-Jan-99	0.86	=			
E621SB003	621SB00301	r	NE	27-Jan-99	0.86	=			
E621SB004	621SB00401	r	NE	27-Jan-99	0.86	=			
Summary Statistics							UCL ₉₅	Mean	
Central EA							19.5	6.09	
NE EA							5.7	3.08	
SW EA							16.1	9.88	

r indicates that the sample was removed during the IM(s).

Fill data were not available for antimony. Therefore, the mean Zone E background value (0.86 mg/Kg) was substituted for the removed samples.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-4

Arsenic Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/Kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E005SB001	005SB00101	NE	25-Sep-95	4.2	=	0.95 - 68	3.8	14.5
E005SB002	005SB00201	r NE	25-Sep-95	0.95	J			
E005SB003	005SB00301	C	22-Sep-95	5.2	=			
E018SB001	018SB00101a	NE	25-Sep-95	3.5	=			
E018SB002	018SB00201a	NE	25-Sep-95	3.2	=			
E018SB003	018SB00301a	NE	03-Oct-95	6.8	=			
E018SB004	018SB00401a	r NE	25-Sep-95	0.95	J			
E018SB005	018SB00501a	NE	25-Sep-95	7.8	=			
E605SB001	605SB00101	NE	25-Sep-95	5.7	=			
E605SB002	605SB00201	r NE	26-Sep-95	0.95	J			
E605SB003	605SB00301	SW	21-Sep-95	10.9	=			
E605SB004	605SB00401	SW	21-Sep-95	18.6	=			
E605SB005	605SB00501	C	26-Sep-95	7.2	=			
E605SB006	605SB00601	C	22-Sep-95	2.5	=			
E605SB007	605SB00701	C	22-Sep-95	3.2	=			
E605SB008	605SB00801	C	22-Sep-95	8.8	=			
E605SB009	605SB00901	NE	22-Sep-95	3.3	=			
E605SB010	605SB01001	C	21-Sep-95	2.3	=			
E605SB011	605SB01101	C	21-Sep-95	1.5	=			
E605SB012	605SB01201	SW	31-May-96	14.9	=			
E605SB013	605SB01301	SW	31-May-96	4.0	=			
E605SB014	605SB01401	SW	31-May-96	16.9	=			
E605SB015	605SB01501	C	31-May-96	1.1	J			
E605SB017	605SB01701	NE	17-Sep-96	5.2	=			
E621SB001	621SB00101	r NE	27-Jan-99	0.95	J			

TABLE 5-4

Arsenic Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID		Exposure Area	Date Collected	Concentration (mg/Kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E621SB002	621SB00201	r	NE	27-Jan-99	0.95	J	0.95 - 68	3.8	14.5
E621SB003	621SB00301	r	NE	27-Jan-99	0.95	J			
E621SB004	621SB00401	r	NE	27-Jan-99	0.95	J			
Summary Statistics							UCL ₉₅	Mean	
Central EA							9.68	3.98	
NE EA							4.11	3.09	
SW EA							18.6	13.06	

r indicates that the sample was removed during the IM(s).

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-5

Beryllium Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/Kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E005SB001	005SB00101	NE	25-Sep-95	0.32	J	0.13 - 1.6	410	31.5
E005SB002	005SB00201	r NE	25-Sep-95	0.11	U			
E005SB003	005SB00301	C	22-Sep-95	0.69	=			
E018SB001	018SB00101a	NE	25-Sep-95	0.2	J			
E018SB002	018SB00201a	NE	25-Sep-95	0.12	U			
E018SB003	018SB00301a	NE	03-Oct-95	0.43	J			
E018SB004	018SB00401a	r NE	25-Sep-95	0.47	J			
E018SB005	018SB00501a	NE	25-Sep-95	0.46	J			
E605SB001	605SB00101	NE	25-Sep-95	0.51	J			
E605SB002	605SB00201	r NE	26-Sep-95	0.13	U			
E605SB003	605SB00301	SW	21-Sep-95	0.84	=			
E605SB004	605SB00401	SW	21-Sep-95	0.66	=			
E605SB005	605SB00501	C	26-Sep-95	2.2	=			
E605SB006	605SB00601	C	22-Sep-95	0.31	J			
E605SB007	605SB00701	C	22-Sep-95	3.7	=			
E605SB008	605SB00801	C	22-Sep-95	0.63	=			
E605SB009	605SB00901	NE	22-Sep-95	0.64	=			
E605SB010	605SB01001	C	21-Sep-95	0.38	J			
E605SB011	605SB01101	C	21-Sep-95	0.94	=			
E605SB012	605SB01201	SW	31-May-96	2.8	=			
E605SB013	605SB01301	SW	31-May-96	1.0	=			
E605SB014	605SB01401	SW	31-May-96	0.53	J			
E605SB015	605SB01501	C	31-May-96	2.2	=			
E605SB017	605SB01701	NE	17-Sep-96	0.46	J			
E621SB001	621SB00101	r NE	27-Jan-99	0.01	U			

TABLE 5-5

Beryllium Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/Kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E621SB002	621SB00201	r NE	27-Jan-99	0.16	U	0.13 - 1.6	410	31.5
E621SB003	621SB00301	r NE	27-Jan-99	0.13	U			
E621SB004	621SB00401	r NE	27-Jan-99	0.01	U			

r indicates that the sample was removed during the IM(s).

Fill data were not available for beryllium.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-6

Copper Residual Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E005SB001	005SB00101	NE	09/25/1995	60.3	=	0.47 - 866	8,200	5,500
E005SB002	005SB00201	r NE	09/25/1995	15.8	=			
E005SB003	005SB00301	C	09/22/1995	91.0	=			
E018SB001	018SB00101a	NE	09/25/1995	69.2	=			
E018SB002	018SB00201a	NE	09/25/1995	5.2	=			
E018SB003	018SB00301a	NE	10/03/1995	27.7	J			
E018SB004	018SB00401a	r NE	09/25/1995	177	=			
E018SB005	018SB00501a	NE	09/25/1995	193	=			
E605SB001	605SB00101	NE	09/25/1995	111	=			
E605SB002	605SB00201	r NE	09/26/1995	3.8	=			
E605SB003	605SB00301	SW	09/21/1995	165	=			
E605SB004	605SB00401	SW	09/21/1995	37.5	=			
E605SB005	605SB00501	C	09/26/1995	291	=			
E605SB006	605SB00601	C	09/22/1995	82.1	=			
E605SB007	605SB00701	C	09/22/1995	746	=			
E605SB008	605SB00801	C	09/22/1995	65.0	=			
E605SB009	605SB00901	NE	09/22/1995	161	=			
E605SB010	605SB01001	C	09/21/1995	65.7	=			
E605SB011	605SB01101	C	09/21/1995	131	=			
E605SB012	605SB01201	SW	05/31/1996	624	=			

TABLE 5-6

Copper Residual Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E605SB013	605SB01301	SW	05/31/1996	179	=	0.47 - 866	8,200	5,500
E605SB014	605SB01401	SW	05/31/1996	106	=			
E605SB015	605SB01501	C	05/31/1996	1,900	=			
E605SB017	605SB01701	NE	09/17/1996	73.0	=			
E621SB001	621SB00101	r NE	01/27/1999	4.7	J			
E621SB002	621SB00201	r NE	01/27/1999	47.1	=			
E621SB003	621SB00301	r NE	01/27/1999	46.3	=			
E621SB004	621SB00401	r NE	01/27/1999	7.5	=			

r indicates that the sample was removed during the IM(s).

Fill data were not substituted for removed samples.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-7

Lead Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E005SB001	005SB00101	NE	25-Sep-95	338	J	1.0 - 400	1,218	1,472 ^d
E005SB002	005SB00201	NE	25-Sep-95	2.4	=			
E005SB003	005SB00301	C	22-Sep-95	462	J			
E005SB004	005SB00401	NE	13-Nov-01	670	=			
E005SB005	005SB00501	NE	13-Nov-01	480	=			
E005SB006	005SB00601	NE	13-Nov-01	440	=			
E005SB007	005SB00701	NE	13-Nov-01	670	=			
E005SB008	005SB00801	NE	13-Nov-01	1,900	=			
E005SB009	005SB00901	NE	13-Nov-01	720	=			
E005SB010	005SB01001	NE	13-Nov-01	2.4	=			
E005SB011	005SB01101	C	13-Nov-01	910	=			
E005SB012	005SB01201	NE	15-Nov-01	2.4	=			
E005SB013	005SB01301	NE	15-Nov-01	4.3	=			
E005SB014	005SB01401	NE	15-Nov-01	2.4	=			
E005SB015	005SB01501	NE	15-Nov-01	160	=			
E005SB016	005SB01601	C	15-Nov-01	840	=			
E005SB017	005SB01701	SW	15-Nov-01	260	=			
E005SB018	005SB01801	SW	14-Nov-01	100	=			
E005SB019	005SB01901	SW	14-Nov-01	160	=			
E005SB021	005SB02101	C	14-Nov-01	750	=			
E005SB022	005SB02201	C	14-Nov-01	1,400	=			
E005SB023	005SB02301	C	14-Nov-01	1,400	=			
E005SB024	005SB02401	C	15-Nov-01	1,900	=			
E005SB025	005SB02501	C	15-Nov-01	700	=			
E005SB026	005SB02601	C	15-Nov-01	980	=			
E005SB027	005SB02701	C	15-Nov-01	400	=			
E005SB028	005SB02801	SW	15-Nov-01	110	=			
E005SB029	005SB02901	SW	14-Nov-01	170	=			

TABLE 5-7

Lead Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E005SB030	005SB03001	SW	14-Nov-01	1,900	=	1.0 - 400	1,218	1,472 ^d
E005SB032	005SB03201	NE	14-Nov-01	930	=			
E005SB033	005SB03301	NE	14-Nov-01	490	=			
E005SB034	005SB03401	NE	15-Nov-01	9.9	=			
E005SB035	005SB03501	NE	19-Nov-01	44	=			
E005SB036	005SB03601	none	15-Nov-01	92	=			
E005SB048	005SB04801	r C	16-Nov-01	2.4	=			
E005SB049	005SB04901	r C	16-Nov-01	2.4	=			
E005SB050	005SB05001	NE	16-Nov-01	8.2	=			
E005SB051	005SB05101	r NE	16-Nov-01	2.4	=			
E005SB052	005SB05201	C	21-Feb-02	80	J			
E005SB053	005SB05301	r NE	21-Feb-02	2.4	=			
E005SB054	005SB05401	r NE	21-Feb-02	2.4	=			
E005SB055	005SB05501	r NE	21-Feb-02	2.4	=			
E005SB056	005SB05601	r NE	21-Feb-02	2.4	=			
E005SB059	005SB05901	r NE	21-Feb-02	2.4	=			
E018SB001	018SB00101a	NE	25-Sep-95	404	J			
E018SB002	018SB00201a	NE	25-Sep-95	8.7	J			
E018SB003	018SB00301a	NE	03-Oct-95	42.4	J			
E018SB004	018SB00401a	r NE	25-Sep-95	2.4	=			
E018SB005	018SB00501a	NE	25-Sep-95	680	J			
E605SB001	605SB00101	NE	25-Sep-95	205	J			
E605SB002	605SB00201	r NE	26-Sep-95	2.4	=			
E605SB003	605SB00301	SW	21-Sep-95	270	J			
E605SB004	605SB00401	SW	21-Sep-95	113	J			
E605SB005	605SB00501	C	26-Sep-95	249	J			
E605SB006	605SB00601	C	22-Sep-95	399	J			
E605SB007	605SB00701	C	22-Sep-95	1,190	J			

TABLE 5-7

Lead Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E605SB008	605SB00801	C	22-Sep-95	460	J	1.0 - 400	1,218	1,472 ^d
E605SB009	605SB00901	NE	22-Sep-95	731	J			
E605SB010	605SB01001	C	21-Sep-95	120	J			
E605SB011	605SB01101	C	21-Sep-95	177	J			
E605SB012	605SB01201	SW	31-May-96	815	J			
E605SB013	605SB01301	SW	31-May-96	627	J			
E605SB014	605SB01401	SW	31-May-96	123	J			
E605SB015	605SB01501	C	31-May-96	1,120	J			
E605SB017	605SB01701	NE	17-Sep-96	176	=			
E621SB001	621SB00101	r NE	27-Jan-99	2.4	=			
E621SB002	621SB00201	r NE	27-Jan-99	2.4	=			
E621SB003	621SB00301	r NE	27-Jan-99	2.4	=			
E621SB004	621SB00401	r NE	27-Jan-99	2.4	=			
E621SB005	621SB00501	r NE	28-Jul-99	2.4	=			
E621SB006	621SB00601	NE	28-Jul-99	16	=			
E621SB007	621SB00701	r NE	28-Jul-99	2.4	=			
E621SB008	621SB00801	r NE	28-Jul-99	2.4	=			
E621SB009	621SB00901	r NE	28-Jul-99	2.4	=			
E621SB010	621SB01001	r NE	28-Jul-99	2.4	=			
E621SB012	621SB01201	NE	28-Jul-99	1,100	=			
E621SB013	621SB01301	r NE	28-Jul-99	2.4	=			
E621SB014	621SB01401	r NE	28-Jul-99	2.4	=			
E621SB015	621SB01501	r NE	28-Jul-99	2.4	=			
E621SB016	621SB01601	NE	28-Jul-99	450	=			
E621SB017	621SB01701	NE	28-Jul-99	2,400	=			
E621SB018	621SB01801	r NE	28-Jul-99	2.4	=			
E621SB019	621SB01901	NE	28-Jul-99	2.4	=			
E621SB020	621SB02001	NE	28-Jul-99	420	=			

TABLE 5-7

Lead Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E621SB022	621SB02201	NE	28-Jul-99	930	=	1.0 - 400	1,218	1,472 ^d
E621SB023	621SB02301	NE	28-Jul-99	2.4	=			
E621SB024	621SB02401	NE	28-Jul-99	1,400	=			
E621SB025	621SB02501	NE	28-Jul-99	1,700	=			
E621SB026	621SB02601	NE	28-Jul-99	240	=			
E621SB027	621SB02701	NE	28-Jul-99	750	=			
E621SB028	621SB02801	NE	28-Jul-99	140	=			
Summary Statistics						UCL ₉₅	Mean	
Central EA						884	677	
NE EA						427	317	
SW EA						961	423	

r indicates that the sample was removed during the IM(s).

Analytical results from the fill material were substituted for the removed samples.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

^d Site-specific SSL presented in the Phase II IM WP (CH2M-Jones, 2002).

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-8

BEQ Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (µg/kg)	Qualifier	Anthropogenic Background ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E005SB001	005SB00101	NE	25-Sep-95	704	=	1,304	NA	NA
E005SB002	005SB00201	r NE	25-Sep-95	393	U			
E005SB003	005SB00301	C	22-Sep-95	864	=			
E018SB001	018SB00101a	NE	25-Sep-95	863	=			
E018SB002	018SB00201a	NE	25-Sep-95	878	U			
E018SB003	018SB00301a	NE	03-Oct-95	644	=			
E018SB004	018SB00401a	r NE	25-Sep-95	393	U			
E018SB005	018SB00501a	NE	25-Sep-95	502	=			
E605SB001	605SB00101	NE	25-Sep-95	590	=			
E605SB002	605SB00201	r NE	26-Sep-95	393	U			
E605SB003	605SB00301	SW	21-Sep-95	1,107	=			
E605SB004	605SB00401	SW	21-Sep-95	6,201	=			
E605SB005	605SB00501	C	26-Sep-95	878	U			
E605SB006	605SB00601	C	22-Sep-95	603	=			
E605SB007	605SB00701	C	22-Sep-95	560	=			
E605SB008	605SB00801	C	22-Sep-95	1265	=			
E605SB009	605SB00901	NE	22-Sep-95	612	=			
E605SB010	605SB01001	C	21-Sep-95	898	=			
E605SB011	605SB01101	C	21-Sep-95	898	=			
E605SB012	605SB01201	SW	31-May-96	370	=			
E605SB013	605SB01301	SW	31-May-96	1,370	=			
E605SB014	605SB01401	SW	31-May-96	1,350	=			
E605SB015	605SB01501	C	31-May-96	464	=			
E605SB017	605SB01701	NE	17-Sep-96	389	=			
E621SB001	621SB00101	r NE	27-Jan-99	393	U			
E621SB002	621SB00201	r NE	27-Jan-99	393	U			

TABLE 5-8

BEQ Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (µg/kg)	Qualifier	Anthropogenic Background ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E621SB003	621SB00301	r NE	27-Jan-99	393	U	1,304	NA	NA
E621SB004	621SB00401	r NE	27-Jan-99	393	U			

^a Background PAHs Study Report, Technical Information for Development of Background BEQ Values (CH2M-Jones, 2001).

r indicates that the sample was removed during the IM(s).

BEQ values for removed samples were calculated from cPAH concentrations in the fill material (393 U ug/Kg)

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-9

Dieldrin Concentrations in Surface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration ($\mu\text{g/kg}$)	Qualifier	Zone E Range of Background Concentrations ^a	Industrial RBC (HI = 0.1) ^b	SSL (DAF = 10) ^c
E605SB012	605SB01201	SW	31-May-96	2.8	U	NA	360	2
E605SB013	605SB01301	SW	31-May-96	2.6	U			
E605SB014	605SB01401	SW	31-May-96	3.3	U			
E605SB015	605SB01501	C	31-May-96	2.7	U			
E621SB001	621SB00101	r NE	27-Jan-99	2.6	U			
E621SB002	621SB00201	r NE	27-Jan-99	2.6	U			
E621SB003	621SB00301	r NE	27-Jan-99	2.6	U			
E621SB004	621SB00401	r NE	27-Jan-99	2.6	U			
Summary Statistics						UCL ₉₅	Mean	
NE EA						2.37	1.84	
SW EA						3.79	1.84	

r indicates that the sample was removed during the IM(s).

Analytical results from the fill material were substituted for the removed samples.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA Region III RBC table (10/2000) based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

^c U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-10

Antimony Concentrations in Subsurface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL (DAF = 10) ^b
				Summary Statistics		Mean	
				Central EA		3.32	
				NE EA		2.49	
				SW EA		11.15	

r indicates that the sample was removed during the IM(s).

Fill data were not available for antimony. Therefore, the mean Zone E background value (0.73 mg/Kg) was substituted for the removed samples.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-11

Lead Concentrations in Subsurface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL (DAF = 10) ^b
E005SB001	005SB00102	NE	25-Sep-95	283	J	1.8 - 322	1,472 ^c
E005SB002	005SB00202	NE	25-Sep-95	2.4	=		
E005SB003	005SB00302	C	22-Sep-95	10.7	J		
E005SB004	005SB00402	NE	13-Nov-01	92	=		
E005SB005	005SB00502	NE	13-Nov-01	200	=		
E005SB006	005SB00602	NE	13-Nov-01	140	=		
E005SB007	005SB00702	NE	13-Nov-01	140	=		
E005SB008	005SB00802	NE	13-Nov-01	7.6	=		
E005SB009	005SB00902	NE	13-Nov-01	350	=		
E005SB010	005SB01002	NE	13-Nov-01	200	=		
E005SB011	005SB01102	C	13-Nov-01	74	=		
E005SB012	005SB01202	NE	15-Nov-01	620	=		
E005SB013	005SB01302	NE	15-Nov-01	700	=		
E005SB014	005SB01402	NE	15-Nov-01	120	=		
E005SB015	005SB01502	NE	15-Nov-01	470	=		
E005SB016	005SB01602	C	15-Nov-01	14	=		
E005SB018	005SB01802	SW	14-Nov-01	90	=		
E005SB019	005SB01902	SW	14-Nov-01	77	=		
E005SB021	005SB02102	C	14-Nov-01	960	=		
E005SB022	005SB02202	C	14-Nov-01	16	=		
E005SB023	005SB02302	C	14-Nov-01	19	=		
E005SB024	005SB02402	C	15-Nov-01	86	=		
E005SB025	005SB02502	C	15-Nov-01	37	=		
E005SB026	005SB02602	C	15-Nov-01	51	=		
E005SB027	005SB02702	C	15-Nov-01	1.3	=		
E005SB028	005SB02802	SW	15-Nov-01	5.6	=		
E005SB029	005SB02902	SW	14-Nov-01	21	=		
E005SB030	005SB03002	SW	14-Nov-01	300	=		

TABLE 5-11

Lead Concentrations in Subsurface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL (DAF = 10) ^b
E005SB032	005SB03202	NE	14-Nov-01	830	=	1.8 - 322	1,472 ^c
E005SB033	005SB03302	NE	14-Nov-01	550	=		
E005SB035	005SB03502	NE	19-Nov-01	52	=		
E005SB036	005SB03602	none	15-Nov-01	52	=		
E005SB048	005SB04802	C	16-Nov-01	2,700	=		
E005SB049	005SB04902	C	16-Nov-01	200	=		
E005SB050	005SB05002	NE	16-Nov-01	2,100	=		
E005SB051	005SB05102	NE	16-Nov-01	2,200	=		
E005SB052	005SB05202	C	21-Feb-02	38	J		
E005SB053	005SB05302	NE	21-Feb-02	24	J		
E005SB054	005SB05402	NE	21-Feb-02	2.4	=		
E005SB055	005SB05502	NE	21-Feb-02	5,700	J		
E005SB056	005SB05602	NE	21-Feb-02	370	J		
E005SB059	005SB05902	NE	21-Feb-02	840	J		
E005SB060	005SB06003	NE	05-Sep-02	540	=		
E005SB061	005SB06103	NE	05-Sep-02	820	=		
E005SB062	005SB06203	NE	05-Sep-02	1,100	=		
E005SB063	005SB06303	C	05-Sep-02	930	=		
E005SB064	005SB06403	NE	05-Sep-02	2.4	=		
E005SB065	005SB06503	NE	16-Oct-02	245	=		
E005SB069	005SB06903	NE	16-Oct-02	570	=		
E005SB070	005SB07003	NE	16-Oct-02	329	=		
E005SB071	005SB071N1	NE	09-Jan-03	19.9	=		
E018SB002	018SB00202a	NE	25-Sep-95	54.5	J		
E018SB003	018SB00302a	NE	03-Oct-95	76.3	J		
E018SB005	018SB00502a	NE	25-Sep-95	199	J		
E605SB002	605SB00202	NE	26-Sep-95	2.4	=		

TABLE 5-11

Lead Concentrations in Subsurface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL (DAF = 10) ^b
E605SB005	605SB00502	C	26-Sep-95	300	J	1.8 - 322	1,472 ^c
E605SB006	605SB00602	C	22-Sep-95	33.2	J		
E605SB008	605SB00802	C	22-Sep-95	14.2	J		
E605SB009	605SB00902	NE	22-Sep-95	200	J		
E605SB010	605SB01002	C	21-Sep-95	68.6	J		
E605SB011	605SB01102	C	21-Sep-95	23.4	J		
E605SB012	605SB01202	SW	31-May-96	97.2	J		
E605SB014	605SB01402	SW	31-May-96	82.4	J		
E605SB015	605SB01502	C	31-May-96	429	J		
E605SB017	605SB01702	NE	17-Sep-96	112	=		
E621SB001	621SB00102	NE	27-Jan-99	36.7	J		
E621SB002	621SB00202	NE	27-Jan-99	1320	J		
E621SB003	621SB00302	NE	27-Jan-99	2,210	J		
E621SB005	621SB00502	NE	28-Jul-99	22	=		
E621SB006	621SB00602	NE	28-Jul-99	19	=		
E621SB007	621SB00702	r NE	28-Jul-99	2.4	=		
E621SB008	621SB00802	NE	28-Jul-99	950	=		
E621SB009	621SB00902	r NE	28-Jul-99	2.4	=		
E621SB010	621SB01002	NE	28-Jul-99	1,200	=		
E621SB012	621SB01202	NE	28-Jul-99	530	=		
E621SB013	621SB01302	r NE	28-Jul-99	2.4	=		
E621SB014	621SB01402	NE	28-Jul-99	420	=		
E621SB015	621SB01502	r NE	28-Jul-99	2.4	=		
E621SB016	621SB01602	NE	28-Jul-99	230	=		
E621SB017	621SB01702	NE	28-Jul-99	170	=		
E621SB018	621SB01802	NE	28-Jul-99	1,000	=		
E621SB019	621SB01902	NE	28-Jul-99	2.4	=		

TABLE 5-11

Lead Concentrations in Subsurface Soil

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Exposure Area	Date Collected	Concentration (mg/kg)	Qualifier	Zone E Range of Background Concentrations ^a	SSL (DAF = 10) ^b
E621SB020	621SB02002	NE	28-Jul-99	120	=	1.8 - 322	1,472 ^c
E621SB022	621SB02202	NE	28-Jul-99	290	=		
E621SB023	621SB02302	NE	28-Jul-99	660	=		
E621SB024	621SB02402	NE	28-Jul-99	45	=		
E621SB025	621SB02502	NE	28-Jul-99	670	=		
E621SB026	621SB02602	NE	28-Jul-99	120	=		
E621SB027	621SB02702	NE	28-Jul-99	37	=		
E621SB028	621SB02802	NE	28-Jul-99	13	=		
Summary Statistics						Mean	
Central EA						300	
NE EA						489	

r indicates that the sample was removed during the IM(s).

Analytical results from the fill material were substituted for the removed samples.

NE is the northeast exposure area.

C is the central exposure area.

SW is the southwest exposure area.

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

^b U.S. EPA generic SSL (Soil Screening Guidance, 1996) based on a dilution attenuation factor (DAF) of 10, unless otherwise noted.

^c Site-specific SSL presented in the Phase II IM WP (CH2M-Jones, 2002).

U indicates that the compound was not detected. The reported value is the detection limit.

UJ indicates that the compound was not detected. The reported value is an estimated detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

= indicates that the compound was detected. The reported value is the concentration of the compound.

TABLE 5-12

Antimony Concentrations in Groundwater Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration ($\mu\text{g/L}$)	Qualifier	MCL ^a	Zone E Range of Background Concentrations ^b
E018GW001	018GW00101a	03/19/96	5.8	J	6	2 - 5
	018GW00102a	07/01/96	13	U		
	018GW00103a	10/28/96	12.2	U		
	018GW00104a	01/07/97	9	U		
E018GW002	018GW00201a	03/20/96	4	U		
	018GW00202a	07/01/96	13	U		
	018GW00203b	10/28/96	2.1	U		
	018GW00204a	01/07/97	2.1	U		
E605GW001	605GW00101	03/19/96	4	U		
	605GW00102	07/01/96	13	U		
	605GW00103	10/28/96	2.1	U		
	605GW00104	01/07/97	2.1	U		
E605GW002	605GW00201	03/20/96	6.6	J		
	605GW00202	07/02/96	13	U		
	605GW00203	10/28/96	6.5	U		
	605GW00204	01/07/97	4.8	U		
E605GW003	605GW00301	03/20/96	6.2	J		
	605GW00302	07/02/96	13	U		
	605GW00303	10/28/96	2.1	U		
	605GW00304	01/08/97	2.1	U		

^a U.S. EPA National Primary Drinking Water Standards (3/2001).

^b Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

U indicates the compound was not detected. The reported value is the reporting limit.

UU indicates the compound was not detected. The reported value is an estimated reporting limit.

J indicates the compound was detected. The reported value is an estimated concentration.

= indicates the compound was detected. The reported value is the measured concentration.

Bold and boxed values are exceedances of the maximum contaminant level (MCL).

TABLE 5-13

Arsenic and Iron Concentrations in Groundwater Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (µg/L)			
			Arsenic	Qualifier	Iron	Qualifier
MCL ^a			50		NA	
Zone E Range of Background Concentrations ^b			3 - 316		144 - 76,600	
E018GW001	018GW00101a	03/19/96	5	U	354	=
	018GW00102a	07/01/96	3.4	J	431	=
	018GW00103a	10/28/96	2.7	J	86	J
	018GW00104a	01/07/97	2.5	U	37.6	J
	018GW001L2	12/05/01	5.21	J	NA	
E018GW002	018GW00201a	03/20/96	5	U	15700	=
	018GW00202a	07/01/96	3.3	U	16900	=
	018GW00203b	10/28/96	2.7	J	12500	=
	018GW00204a	01/07/97	2.5	U	12900	J
	018GW002L2	12/05/01	2.6	U	NA	
E605GW001	605GW00101	03/19/96	6.8	J	10400	=
	605GW00102	07/01/96	11.5	=	9650	=
	605GW00103	10/28/96	11.1	=	10600	=
	605GW00104	01/07/97	10.1	J	11000	J
E605GW002	605GW00201	03/20/96	5	U	24200	=
	605GW00202	07/02/96	11.7	=	28200	=
	605GW00203	10/28/96	5.4	J	8180	=
	605GW00204	01/07/97	4.3	J	16400	J
E605GW003	605GW00301	03/20/96	45.2	=	9580	=
	605GW00302	07/02/96	85.5	=	7850	=
	605GW00303	10/28/96	48.9	=	5020	=
	605GW00304	01/08/97	82.7	J	9420	J
E605GW004	605GW004L2	12/05/01	6.98	J	NA	
E605GW005	605GW005L2	12/05/01	8.91	J	NA	
E605GW006	605GW006L2	12/05/01	4.97	J	NA	

^a U.S. EPA National Primary Drinking Water Standards (3/2001).

^b Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

U indicates the compound was not detected. The reported value is the reporting limit.

UJ indicates the compound was not detected. The reported value is an estimated reporting limit.

J indicates the compound was detected. The reported value is an estimated concentration.

= indicates the compound was detected. The reported value is the measured concentration.

Bold and boxed values are exceedances of the maximum contaminant level (MCL).

NA indicates that the information was not available or not applicable.

TABLE 5-14

Lead Concentrations in Groundwater Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	MCL ^a	Zone E Range of Background Concentrations ^b
E018GW001	018GW00101a	03/19/96	4.6	=	15	2 - 47
	018GW00102a	07/01/96	2.7	U		
	018GW00103a	10/28/96	1.7	U		
	018GW00104a	01/07/97	1.7	U		
	018GW001L2	12/05/01	5.58	=		
E018GW002	018GW00201a	03/20/96	3	U		
	018GW00202a	07/01/96	1.4	U		
	018GW00203b	10/28/96	1.7	U		
	018GW00204a	01/07/97	1.7	U		
	018GW002L2	12/05/01	2.43	U		
E605GW001	605GW00101	03/19/96	3	U		
	605GW00102	07/01/96	3.8	U		
	605GW00103	10/28/96	1.7	U		
	605GW00104	01/07/97	1.7	U		
E605GW002	605GW00201	03/20/96	426	=		
	605GW00202	07/02/96	68.6	=		
	605GW00203	10/28/96	404	=		
	605GW00204	01/07/97	1,970	=		
E605GW003	605GW00301	03/20/96	3	U		
	605GW00302	07/02/96	2.5	U		
	605GW00303	10/28/96	1.7	U		
	605GW00304	01/08/97	1.7	U		
E605GW004	605GW004L2	12/05/01	21.4	=		
	605GW004M1	09/05/02	15	=		
	605GW04RN1 (unfiltered)	02/28/03	3.10	J		
E605GW005	605GW04RN1 (filtered)	02/28/03	5	U		
	605GW005L2	12/05/01	4.63	=		
	605GW005M1	09/05/02	7	=		
	605GW05RN1 (unfiltered)	02/28/03	10	U		
E605GW006	605GW05RN1 (filtered)	02/28/03	25	U		
	605GW006L2	12/05/01	3.77	=		
	605GW06RN1 (unfiltered)	02/28/03	5	U		
	605GW06RN1(filtered)	02/28/03	5.63	=		

^a U.S. EPA National Primary Drinking Water Standards (3/2001).

^b Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

U indicates the compound was not detected. The reported value is the reporting limit.

UJ indicates the compound was not detected. The reported value is an estimated reporting limit.

J indicates the compound was detected. The reported value is an estimated concentration.

= indicates the compound was detected. The reported value is the measured concentration.

Bold and boxed values are exceedances of the maximum contaminant level (MCL).

TABLE 5-15

Dioxin Concentrations in Groundwater Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Dioxin Cogener	Station ID	Sample ID	Date Collected	Concentration (pg/L)	Qualifier	MCL ^a
1,2,3,4,6,7,8-Heptachlorodibenzofuran	E605GW001	605GW00102	07/01/96	5.9	EMPC	NA
	E605GW002	605GW00202	07/02/96	4.26	EMPC	
	E605GW003	605HW00301	03/20/96	3.62	U	
		605GW00302	07/02/96	3.28	EMPC	
		605HW00302	07/02/96	1.72	EMPC	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	E605GW001	605GW00102	07/01/96	3.65	U	NA
	E605GW002	605GW00202	07/02/96	1.82	U	
	E605GW003	605HW00301	03/20/96	3.51	U	
		605GW00302	07/02/96	3.55	EMPC	
		605HW00302	07/02/96	2.67	U	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	E605GW001	605GW00102	07/01/96	3.65	U	NA
	E605GW002	605GW00202	07/02/96	1.75	U	
	E605GW003	605HW00301	03/20/96	4.36	U	
		605GW00302	07/02/96	2.01	U	
		605HW00302	07/02/96	1.58	U	
1,2,3,4,7,8-Hexachlorodibenzofuran	E605GW001	605GW00102	07/01/96	1.7	U	NA
	E605GW002	605GW00202	07/02/96	1.01	U	
	E605GW003	605HW00301	03/20/96	4.65	U	
		605GW00302	07/02/96	1.6	U	
		605HW00302	07/02/96	1.79	U	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	E605GW001	605GW00102	07/01/96	3.47	U	NA
	E605GW002	605GW00202	07/02/96	3.07	U	
	E605GW003	605HW00301	03/20/96	5.03	U	
		605GW00302	07/02/96	2.67	U	
		605HW00302	07/02/96	4.83	U	
1,2,3,6,7,8-Hexachlorodibenzofuran	E605GW001	605GW00102	07/01/96	1.24	U	NA
	E605GW002	605GW00202	07/02/96	0.608	U	
	E605GW003	605HW00301	03/20/96	2.98	U	
		605GW00302	07/02/96	0.965	U	
		605HW00302	07/02/96	1.08	U	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	E605GW001	605GW00102	07/01/96	2.52	U	NA
	E605GW002	605GW00202	07/02/96	1.83	U	
	E605GW003	605HW00301	03/20/96	3.15	U	
		605GW00302	07/02/96	1.59	U	
		605HW00302	07/02/96	2.88	U	
1,2,3,7,8,9-Hexachlorodibenzofuran	E605GW001	605GW00102	07/01/96	1.68	U	NA

TABLE 5-15

Dioxin Concentrations in Groundwater Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Dioxin Congener	Station ID	Sample ID	Date Collected	Concentration (pg/L)	Qualifier	MCL ^a
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	E605GW002	605GW00202	07/02/96	1.07	U	NA
	E605GW003	605HW00301	03/20/96	4.59	U	
		605GW00302	07/02/96	1.69	U	
		605HW00302	07/02/96	1.89	U	
	E605GW001	605GW00102	07/01/96	2.62	U	
	E605GW002	605GW00202	07/02/96	2.23	U	
	E605GW003	605HW00301	03/20/96	3.66	U	
		605GW00302	07/02/96	1.94	U	
1,2,3,7,8-Pentachlorodibenzofuran		605HW00302	07/02/96	3.51	U	NA
	E605GW001	605GW00102	07/01/96	2.1	U	
	E605GW002	605GW00202	07/02/96	2.9	U	
	E605GW003	605HW00301	03/20/96	3.2	U	
		605GW00302	07/02/96	2.14	U	
		605HW00302	07/02/96	1.88	U	
	E605GW001	605GW00102	07/01/96	2.66	U	
	E605GW002	605GW00202	07/02/96	1.96	U	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	E605GW003	605HW00301	03/20/96	5.26	U	NA
		605GW00302	07/02/96	2.64	U	
		605HW00302	07/02/96	2.61	U	
	E605GW001	605GW00102	07/01/96	1.59	U	
	E605GW002	605GW00202	07/02/96	0.943	U	
	E605GW003	605HW00301	03/20/96	626	EMPC	
		605GW00302	07/02/96	1.49	U	
		605HW00302	07/02/96	1.67	U	
2,3,4,6,7,8-Hexachlorodibenzofuran	E605GW001	605GW00102	07/01/96	2.02	U	NA
	E605GW002	605GW00202	07/02/96	2.96	U	
	E605GW003	605HW00301	03/20/96	3.21	U	
		605GW00302	07/02/96	2.18	U	
		605HW00302	07/02/96	1.91	U	
	E605GW001	605GW00102	07/01/96	2.49	U	
	E605GW002	605GW00202	07/02/96	1.19	U	
	E605GW003	605HW00301	03/20/96	2.23	U	
2,3,4,7,8-Pentachlorodibenzofuran		605GW00302	07/02/96	1.45	U	NA
		605HW00302	07/02/96	1.3	U	
	E605GW001	605GW00102	07/01/96	5.12	U	
	E605GW002	605GW00202	07/02/96	2	U	
	E605GW003	605HW00301	03/20/96	5.1	U	
2,3,7,8-Tetrachlorodibenzofuran	E605GW001	605GW00102	07/01/96	5.12	U	30
	E605GW002	605GW00202	07/02/96	2	U	
	E605GW003	605HW00301	03/20/96	5.1	U	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	E605GW001	605GW00102	07/01/96	5.12	U	30
	E605GW002	605GW00202	07/02/96	2	U	
	E605GW003	605HW00301	03/20/96	5.1	U	

TABLE 5-15

Dioxin Concentrations in Groundwater Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Dioxin Cogener	Station ID	Sample ID	Date Collected	Concentration (pg/L)	Qualifier	MCL ^a
Octachlorodibenzofuran	E605GW001	605GW00302	07/02/96	1.6	U	NA
		605HW00302	07/02/96	2.27	U	
		605GW00102	07/01/96	3.67	EMPC	
		605GW00202	07/02/96	5.12	EMPC	
		605HW00301	03/20/96	4.76	U	
		605GW00302	07/02/96	6.69	EMPC	
Octachlorodibenzo-p-dioxin	E605GW001	605HW00302	07/02/96	1.89	EMPC	NA
		605GW00102	07/01/96	22.6	EMPC	
		605GW00202	07/02/96	16.8	EMPC	
		605HW00301	03/20/96	4.2	U	
		605GW00302	07/02/96	20.5	EMPC	
		605HW00302	07/02/96	14.2	EMPC	
TEQs	E605GW001	605GW00102	07/01/96	0.085	EMPC	30 ^b
		605GW00202	07/02/96	0.065	EMPC	
		605HW00301	03/20/96	62.6	EMPC	
		605GW00302	07/02/96	0.095	EMPC	

^a U.S. EPA National Primary Drinking Water Standards (3/2001).

^b MCL is for 2,3,7,8-TCDD.

U indicates the compound was not detected. The reported value is the reporting limit.

UJ indicates the compound was not detected. The reported value is an estimated reporting limit.

J indicates the compound was detected. The reported value is an estimated concentration.

= indicates the compound was detected. The reported value is the measured concentration.

Bold and boxed values are exceedances of the maximum contaminant level (MCL).

EMPC estimated maximum possible concentration.

NOTE: Original figure created in color

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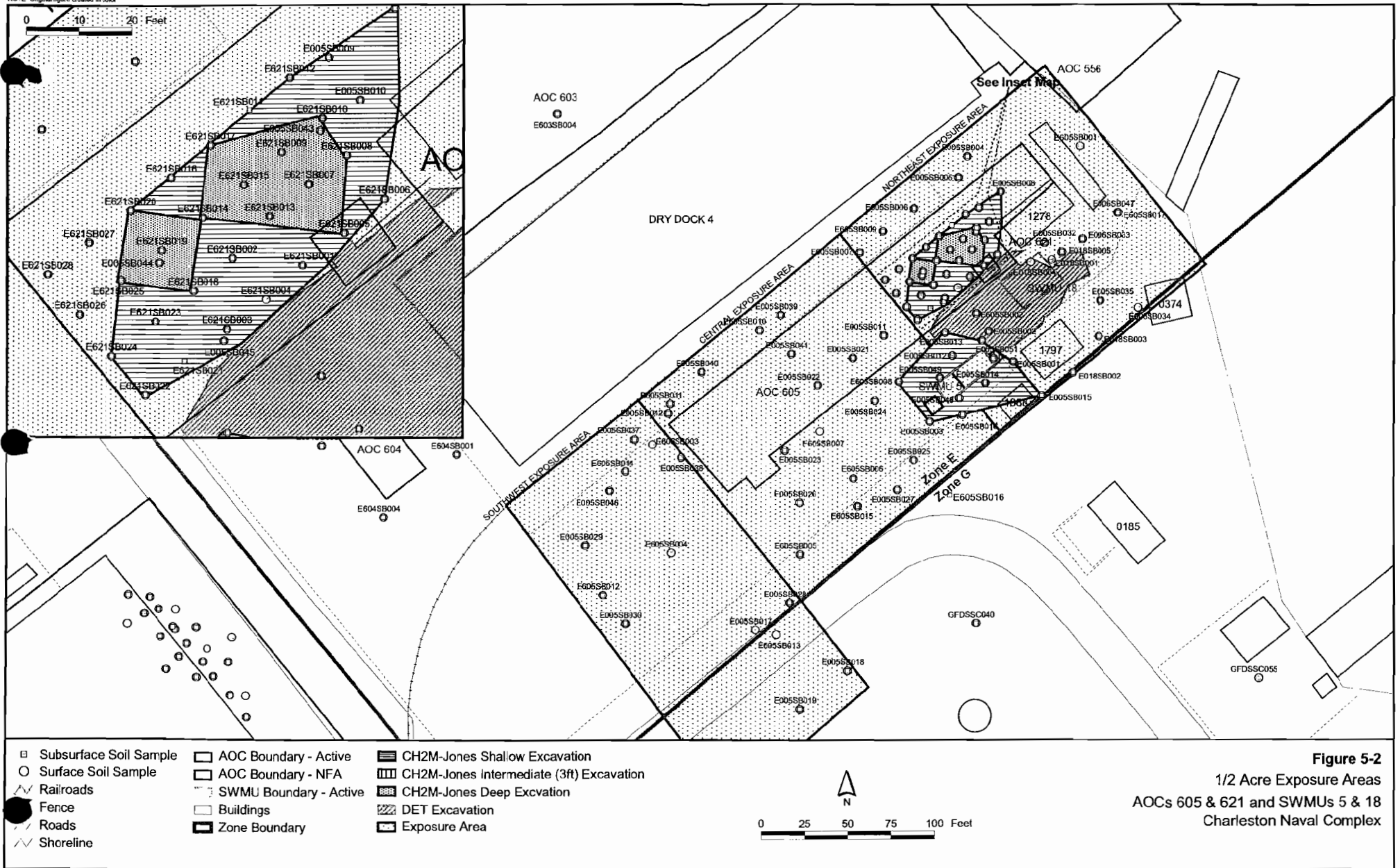
- Subsurface Soil Sample
- Surface Soil Sample
- Railroads
- Fence
- Roads
- Shoreline
- AOC Boundary - Active
- AOC Boundary - NFA
- SWMU Boundary - Active
- Buildings
- Zone Boundary
- Surface Soils Excavation (0-1 ft bls)
- Intermediate Soil Excavation Area (1-3 ft bls)
- Subsurface Soil Excavation (1-5 ft bls)
- Subsurface Excavation Area (DET)
- Intermediate Interval Delineation Sample

File Path: C:\Project\Zone_Excavation\mms\5412\Apron\mms_031803.rpt Date: 10 May 2003 12:45 User: ASD/OSATU Figure 5-1 Excavation Areas with Soil Sample Locations

0 25 50 75 100 Feet

Figure 5-1
Excavation Areas with Soil Sample Locations
AOCs 605 & 621 and SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL



6.0 Summary of Information Related to Site Closeout Issues

6.1 RFI Status

Based on the sampling completed as part of the RFI, and the subsequent IM-related investigations, the RFI for the Combined SWMU 5 site is considered complete.

6.2 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable maximum contaminant level (MCL), preceded or followed by detections of these same metals below the MCL or below the practicable quantitation limit.

Thallium was not detected in any groundwater samples collected at SWMU 5. Arsenic and antimony each exceeded their respective MCLs in two samples. Based on the discussion of these chemicals in Section 5.0, arsenic and antimony are not considered COCs.

6.3 Potential Linkage to SWMU 37, Investigated Sanitary Sewers at the CNC

A groundwater probe sample (037GP015E1) was taken as part of the SWMU 37 investigation adjacent to SWMU 5. This sample was located next to sanitary sewer lines approximately 45 feet from AOC 605. It was analyzed for cyanide, metals, and VOCs. No VOCs were detected in this sample. Based on these data, further investigation of a linkage between SWMU 37 and the Combined SWMU 5 site is not warranted.

6.4 Potential Linkage to AOC 699, Investigated Storm Sewers at the CNC

The closest storm drain is approximately 55 feet south of AOC 605. Two groundwater probe samples (699GP001E1 and 699GP002E1) and one soil probe sample (699SP001E1) were collected as part of the AOC 699 investigation near Combined SWMU 5. These samples

1 were located next to storm sewer lines south of Combined SWMU 5. The samples were
2 analyzed for cyanide, metals, and VOCs. No VOCs were detected in the groundwater probe
3 samples. Arsenic was detected below its Zone E BRC in the soil probe sample, indicating
4 that arsenic concentrations in soil are consistent with background concentrations. Based on
5 these findings, further evaluation of this linkage is not warranted.

6 **6.5 Potential Linkage to AOC 504, Investigated Railroad Lines** 7 **at the CNC**

8 The area associated with Combined SWMU 5 is bounded on its north side by railroad spurs.
9 Additionally, review of historical drawings show that railroad tracks were present within
10 and to the southwest of Combined SWMU 5.

11 One soil probe sample (504SP02AE1) was collected to the southwest of SWMU 5 to evaluate
12 the railroad lines in the area of the sites. The sample was analyzed for metals and cyanide.
13 Arsenic was detected below its Zone E BRC in the soil probe sample, indicating that arsenic
14 concentrations in soil are consistent with background concentrations. No information was
15 found to suggest a linkage between the Combined SWMU 5 area and the investigated
16 railroad lines of AOC 504. Further evaluation of this issue is not warranted.

17 **6.6 Potential Migration Pathways to Surface Water Bodies at** 18 **the CNC**

19 The nearest surface water body to Combined SWMU 5 is the Cooper River, which lies
20 approximately 40 feet to the northeast. Potential migration pathways from the site to surface
21 water include overland flow via storm water runoff and runoff directed to the storm sewer
22 system, which discharges to the Cooper River.

23 Because current data indicates that Combined SWMU 5 has been adequately remediated,
24 runoff contacting site soil is not considered to be a threat to the Cooper River.

25 The potential for groundwater contamination associated with Combined SWMU 5 to enter
26 the Cooper River has also been addressed by the remedial actions at the site. Current data
27 indicate the no COPCs are present in site groundwater to migrate to the Cooper River.

28 Based on the above discussion, further evaluation of a potential migration pathway to the
29 Cooper River is not warranted.

6.7 Potential Contamination in Oil/Water Separators (OWSs)

There are no known OWSs associated with Combined SWMU 5 and no reference made in the *Oil Water Separator Data*, Department of the Navy, September 2000 report to an OWS at this facility. Therefore, further evaluation of this issue is not warranted.

6.8 Land Use Controls (LUCs)

CH2M-Jones proposes that this site be used only for industrial land use. LUCs restricting the land use to industrial use only will be implemented by the BCT. The LUC issue will be addressed in the CMSWP and the CMS Report for Combined SWMU 5.

TABLE 6-1

Antimony, Arsenic, and Thallium Concentrations in Groundwater

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	MCL	Zone E Range of Background Concentrations ^a
Antimony	E018GW001	018GW00101a	03/19/96	5.8	J	6	2 - 5
		018GW00102a	07/01/96	13	U		
		018GW00103a	10/28/96	12.2	U		
		018GW00104a	01/07/97	9	U		
	E018GW002	018GW00201a	03/20/96	4	U		
		018GW00202a	07/01/96	13	U		
		018GW00203b	10/28/96	2.1	U		
		018GW00204a	01/07/97	2.1	U		
	E605GW001	605GW00101	03/19/96	4	U		
		605GW00102	07/01/96	13	U		
		605GW00103	10/28/96	2.1	U		
		605GW00104	01/07/97	2.1	U		
	E605GW002	605GW00201	03/20/96	6.6	J		
		605GW00202	07/02/96	13	U		
		605GW00203	10/28/96	6.5	U		
		605GW00204	01/07/97	4.8	U		
	E605GW003	605GW00301	03/20/96	6.2	J		
		605GW00302	07/02/96	13	U		
		605GW00303	10/28/96	2.1	U		
		605GW00304	01/08/97	2.1	U		
Arsenic	E018GW001	018GW00101a	03/19/96	5	U	50	3 - 316
		018GW00102a	07/01/96	3.4	J		
		018GW00103a	10/28/96	2.7	J		
		018GW00104a	01/07/97	2.5	U		
		018GW001L2	12/05/01	5.21	J		
	E018GW002	018GW00201a	03/20/96	5	U		
		018GW00202a	07/01/96	3.3	U		
		018GW00203b	10/28/96	2.7	J		
		018GW00204a	01/07/97	2.5	U		

TABLE 6-1

Antimony, Arsenic, and Thallium Concentrations in Groundwater

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	MCL	Zone E Range of Background Concentrations ^a
Arsenic		018GW002L2	12/05/01	2.6	U	50	3 - 316
	E605GW001	605GW00101	03/19/96	6.8	J		
		605GW00102	07/01/96	11.5	=		
		605GW00103	10/28/96	11.1	=		
		605GW00104	01/07/97	10.1	J		
	E605GW002	605GW00201	03/20/96	5	U		
		605GW00202	07/02/96	11.7	=		
		605GW00203	10/28/96	5.4	J		
		605GW00204	01/07/97	4.3	J		
	E605GW003	605GW00301	03/20/96	45.2	=		
		605GW00302	07/02/96	85.5	=		
		605GW00303	10/28/96	48.9	=		
		605GW00304	01/08/97	82.7	J		
	E605GW004	605GW004L2	12/05/01	6.98	J		
	E605GW005	605GW005L2	12/05/01	8.91	J		
	E605GW006	605GW006L2	12/05/01	4.97	J		
Thallium	E018GW001	018GW00101a	03/19/96	5	U	2	3 - 6
		018GW00102a	07/01/96	3.4	U		
		018GW00103a	10/28/96	2.7	U		
		018GW00104a	01/07/97	2.7	U		
	E018GW002	018GW00201a	03/20/96	5	U		
		018GW00202a	07/01/96	3.4	U		
		018GW00203b	10/28/96	2.7	U		
		018GW00204a	01/07/97	2.7	U		
	E605GW001	605GW00101	03/19/96	5	U		
		605GW00102	07/01/96	3.4	U		
		605GW00103	10/28/96	2.7	U		
		605GW00104	01/07/97	2.7	U		
	E605GW002	605GW00201	03/20/96	5	U		

TABLE 6-1

Antimony, Arsenic, and Thallium Concentrations in Groundwater

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Station ID	Sample ID	Date Collected	Concentration (µg/L)	Qualifier	MCL	Zone E Range of Background Concentrations ^a
Thallium	E605GW003	605GW00202	07/02/96	3.4	U	2	3 - 6
		605GW00203	10/28/96	2.7	U		
		605GW00204	01/07/97	2.7	U		
		605GW00301	03/20/96	5	U		
		605GW00302	07/02/96	3.4	U		
		605GW00303	10/28/96	2.7	U		
		605GW00304	01/08/97	2.7	U		

^a Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project, CH2M-Jones, Revision 1A, December 2001.

U indicates the compound was not detected. The reported value is the reporting limit.

UJ indicates the compound was not detected. The reported value is an estimated reporting limit.

J indicates the compound was detected. The reported value is an estimated concentration.

= indicates the compound was detected. The reported value is the measured concentration.

Bold and boxed values are exceedances of the maximum contaminant level (MCL).

7.0 Interim Measure Completion Report

7.1 Pre-excavation Sampling and Contaminant Delineation

Extensive investigations have been performed at Combined SWMU 5. During the RFI in 1995 and 1996, soil and groundwater samples were collected at the site to evaluate SWMU 5, SWMU 18, and AOC 605. Based on these data the DET performed an IM in 1997 and 1998. The goal of the IM was to remove lead-impacted soil at the site. Approximately 510 tons (340 yd³) of lead-impacted soil were removed and disposed of as hazardous waste. Confirmation sample analytical results indicated that the goal of the IM was met and the IM was terminated.

In 1999, subsequent to the DET's IM, 26 soil borings were advanced through Pad 1278 to evaluate AOC 621. The soil samples were collected by EnSafe, but the analytical results were not previously presented. Section 4.2 of this RFIRA/IMCR/CMSWP presents the analytical results from the AOC 621 investigation. Metals (lead and antimony) were found at concentrations that exceeded their respective COPC screening criteria. Dieldrin was also detected at a concentration that marginally exceeded its SSL, but not its RBC.

CH2M-Jones evaluated the data collected from the previous investigations and concluded that additional soil removal was appropriate for lead-impacted soil. Additional sampling was also needed to complete the delineation of select metals (lead and nickel), pesticides (dieldrin), and SVOCs (2,4-dinitrotoluene). SPLP and groundwater samples were also recommended to determine if metals concentrations in soil were a threat to shallow groundwater. In October 2001 CH2M-Jones submitted the Phase I IM WP to propose the remedial action and sampling regimen. On November 21, 2001 SCDHEC issued a letter of approval for the Phase I IMWP.

In February 2002 CH2M-Jones submitted a Sampling and Analysis (SAP) for collection of additional SPLP samples. Eight soil borings were proposed with surface subsurface soil samples to be collected at each boring. Five locations were proposed for lead analysis (total and SPLP); two locations for nickel (total and SPLP); and one location for lead and nickel (total and SPLP).

CH2M-Jones developed the Phase II IMWP, which evaluated all site data, including the data collected during the SAP sampling. The Phase II IMWP calculated site-specific SSLs for lead

1 and nickel. The SSLs were used to develop MCSs at the site. Based on these results, the area
2 of lead-impacted soil above the MCS was determined and proposed for excavation. Nickel
3 was found to be below its MCS. The Phase II IMWP also proposed the collection of five
4 intermediate interval samples (1 to 3 ft bls) to evaluate the presence of lead between the
5 previously collected surface and subsurface samples.

6 SCDHEC granted conditional approval of the SAP on May 31, 2002. Approval was
7 conditioned on relocating the intermediate interval samples, collecting confirmation
8 samples from the floor of excavation, and collecting additional groundwater samples.

9 CH2M-Jones implemented the Phase II IMWP Addendum, which incorporated the
10 comments issued by the SCDHEC. Responses to comments are provided in Appendix H.

11 The analytical results from the intermediate interval samples indicated that the excavation
12 depth in a small area at the east end of the acid neutralization needed to include soil to a
13 depth of 3 ft bls. CH2M-Jones prepared the Phase II IMWP Addendum 2 to present the
14 proposed change to the excavation area. The SCDHEC granted approval of the Phase II
15 IMWP Addendum 2 on October 14, 2002.

16 Data from all of these investigations were incorporated into the final IM at combined
17 SWMU 5. These data are presented in detail in Section 4.

18 **7.2 Technical Approach of the Interim Measure**

19 The 2002/2003 IM at SWMU 5 was intended to address remaining lead-impacted soil
20 exceeding the MCS developed in the Phase II IMWP. The MCSs were 1,218 mg/kg for
21 surface soil for protection of human health receptors under an industrial land use scenario
22 and 1,427 mg/kg for soil to be protective of groundwater. The extent of soil removal was
23 determined by the concentrations detected in the pre-excavation delineation and
24 confirmation samples. Excavation limits were located to include soil criteria exceedances
25 and intersect with previous (1998) IM excavation limits.

26 **7.3 Excavation Activities**

27 Limits of excavation (corners) based on coordinates from IM work planning were marked in
28 the field. Because the excavation area was beneath a concrete pad (Pad 1278), the pad had to
29 be demolished prior to excavation activities.

30 Environmental Projects Group, Mt. Pleasant, SC was contracted to remove the concrete pad
31 prior to the excavation. CH2M-Jones personnel marked the area of the slab to be removed in

1 accordance with the Phase II IMWP. EPG removed the concrete within the excavation area
2 by October 14, 2002. The concrete debris was loaded into rollofs and staged at the site for
3 subsequent removal and disposal. 87.6 tons of concrete debris were removed and sent to the
4 Oakridge Landfill, Dorchester, SC. Manifests for the concrete disposal are provided in
5 Appendix I.

6 Excavation began on October 15, 2002; excavated soil from one side of each excavation area
7 was stockpiled on the opposite side of the area within the limits of excavation.

8 On October 16, 2002 the backhoe uncovered a PVC electrical conduit at the east end of the
9 acid neutralization tank containing an energized electrical wire which was not identified
10 during the utility clearance conducted prior to the excavation. Excavation activities were
11 terminated in the area of the electrical wire and caution tape was put up around the area
12 until the electricity could be turned off. South Carolina Electric and Gas (SCE&G) and
13 Central Locating Services (CLS, who conducted the utility survey) were contacted to
14 determine the source of the line so that it could be de-energized. Initial attempts to find the
15 power source were not successful. Because the source of the power could not be located, on
16 October 21, 2002 W.D. Robinson Electrical Co., Inc. was contracted to secure the wires
17 within the conduit. The wires were cut, taped, and secured within the conduit. Further
18 excavation was halted pending results from the TCLP samples collected from the stockpiles.

19 Excavation in the northern area continued without incident. By the end of the second day of
20 work, soil from the east portion of the northern excavation area had been removed to the
21 extent practical. This included the eastern deep excavation area. Waste characterization
22 samples (TCLP) were collected on October 16, 2002 from the northern (and southern)
23 stockpile. Confirmation samples from the bottom of the deep excavation and the walls of the
24 3-foot excavation were also collected at this time. Further excavation was postponed for the
25 analytical results from these samples. Because the deep excavation extended below the top
26 of the water table, it was decided to backfill the deep excavation to prevent the walls from
27 collapsing. On October 17, 2002 six loads of clean fill material were delivered to the site and
28 used to fill the deep excavation area.

29 On January 6, 2003 trucks from Robbie D. Wood Trucking Co. began hauling the stockpiled
30 soil from the site to the Envirite of Ohio, Inc. disposal facility located Canton Ohio. Disposal
31 manifests are provided in Appendix J. Excavation activities resumed once some of the
32 stockpiled soil was removed. Delivery of clean backfill material from the designated borrow
33 area began on January 7, 2003.

On January 9, 2003 the western deep excavation area was completed and the confirmation sample was subsequently collected from the bottom. Excavation and loading of stockpiled soil was completed on this day. Clean fill material continued to be delivered and spread within excavation areas. Site restoration was completed on January 10, 2003. During the site inspection, a representative from the Navy Caretaker Site Office (CSO) was notified of the electrical wires and shown their location. Photograph 3 in Appendix K shows the electrical box.

Air particulates were monitored with dust monitors, and readings varied from 0.0 milligrams per cubic meter (mg/m^3) (normal) to $0.035 \text{ mg}/\text{m}^3$ (while loading trucks). These data indicate that dust levels were below the action level of $0.5 \text{ mg}/\text{m}^3$.

7.3.1 Southern Excavation

This excavation was 1 foot deep except around soil boring E005SB051 where the intermediate interval sample (005SB06403) indicated that removal to 3 feet was appropriate to remove lead-impacted soil above the MCS. The excavation overlapped the previous 1998 excavation limits to the northeast.

7.3.2 Northern Excavation

This excavation was 1 foot deep over most of the area, with two areas identified for removal to a depth of 5 feet. The excavation overlapped the previous 1998 excavation limits along the southeast.

7.3.4 Waste Characterization Sampling

On August 19, 2002 a composite waste characterization sample was collected of the demolished concrete pad. The sample was analyzed for TCLP characteristics for the eight RCRA metals. The results of the waste characterization sample are presented in Table 7-1. The waste characterization sample was collected to determine the appropriate disposal of the concrete debris. The analytical results indicated that the concrete was suitable for Subtitle D disposal.

A total of four composite waste characterization samples were collected to determine the appropriate disposal method for the excavated soil. The analytical results for the TCLP samples is presented in Table 7-2. Two TCLP samples (005SA001M2 and 005SA002M2) were collected prior to the excavation on September 5, 2002. The analytical results from these samples were presented in the Phase II IMWP Addendum 2 and indicated that the leachable lead was greater than the *Maximum Concentration of Contaminants for the Toxicity Characteristic* presented in 40CFR261.24.

1 The stockpiles of excavated soil were also sampled for waste characterization (005SB06603
2 and 005SB06703). The analytical results from these samples also indicated that the leachable
3 lead was greater than the criteria.

4 Based on these results the excavated soil was characterized as hazardous waste and sent to
5 an appropriate disposal facility. Approximately 460 tons of soil were removed and
6 transported to the Envirite of Ohio, Inc. disposal facility Canton Ohio. Disposal manifests
7 are provided in Appendix J.

8 Waste storage, handling, characterization and disposal were conducted in accordance with
9 the EPA guidance document, *Management of Remediation Waste Under RCRA* (1998).

10 **7.3.5 Confirmation Sampling**

11 Because the horizontal extent of the lead-impacted soil in the intermediate interval (1 – 3 ft
12 bls) was not completely defined during the delineation sampling, additional confirmation
13 sampling was considered appropriate. Two confirmation samples (005SB06903 and
14 005SB07003) were collected from the walls of the 3-foot excavation area. The analytical
15 results from the confirmation samples are presented in Table 7-3 and their locations are
16 shown in Figure 7-1.

17 The analytical results from the horizontal confirmation samples were below the MCS,
18 indicating that lead-impacted soil above the MCS was adequately removed during the IM.

19 At the request of the SCDHEC, a vertical confirmation sample was collected from the floor
20 of each deep excavation area. The analytical results from the confirmation samples are
21 presented in Table 7-3 and their locations are shown in Figure 7-1.

22 The analytical results from the vertical confirmation samples were below the MCS,
23 indicating that lead-impacted soil above the MCS was adequately removed during the IM.

24 **7.3.6 Site Restoration**

25 The excavations were backfilled with clean soil and graded. The removed concrete was not
26 replaced. Grading was completed on January 10, 2003.

27 Appendix K includes copies of site photos taken during various remediation activities at
28 SWMU 5.

TABLE 7-1

TCLP Results for Waste Characterization Sample of Concrete

*RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E,
 Charleston Naval Complex*

Chemical	Date Collected	Concentration (mg/L)	Qualifier	TCLP Criteria (40CFR261.24)
Arsenic	08/19/2002	0.04	U	5
Barium	08/19/2002	0.16	U	100
Cadmium	08/19/2002	0.004	U	1
Chromium	08/19/2002	0.005	U	5
Lead	08/19/2002	0.12	J	5
Mercury	08/19/2002	0.001	U	0.2
Selenium	08/19/2002	0.027	U	1
Silver	08/19/2002	0.012	U	5

U indicates that the compound was not detected. The reported value is the detection limit.

J indicates that the compound was detected. The reported value is the estimated concentration of the compound.

mg/L milligrams per liter

TABLE 7-2

Lead TCLP Results for Waste Characterization Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Sample ID	Date Collected	Concentration (mg/L)	Qualifier	TCLP Criteria (40CFR261.24)
Lead	005SA001M2	09/05/2002	350	=	5
	005SA002M2	09/05/2002	85	=	
	005SB06603	10/16/2002	202	=	
	005SB06704	10/17/2002	60.7	=	

= indicates that the compound was detected. The reported value is the measured concentration of the compound.
Bold and boxed values exceed the TCLP criteria.

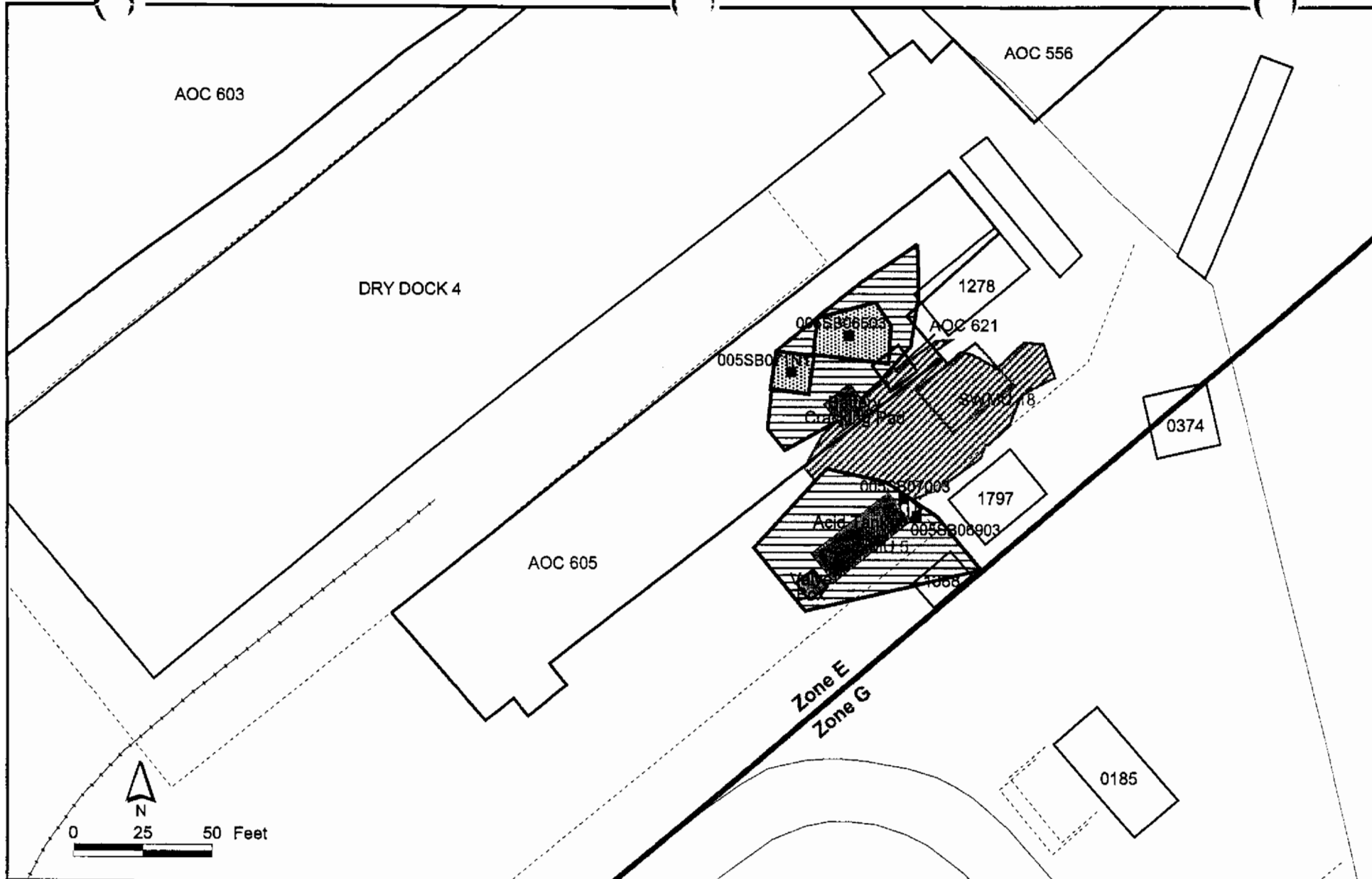
TABLE 7-3

Lead Concentrations in Confirmation Samples

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Chemical	Sample ID	Location	Date Collected	Concentration (mg/kg)	Qualifier	Site-Specific SSL
Lead	005SB06903	South wall of 3-ft excavation	10/16/2002	570	=	1,472
	005SB07003	North wall of 3-ft excavation	10/16/2002	329	=	
	005SB06503	Floor of east 5-ft excavation	10/16/2002	245	=	
	005SB071N1	Floor of west 5-ft excavation	01/09/2003	19.9	=	

= indicates that the compound was detected. The reported value is the measured concentration of the compound.
Bold and boxed values exceed the site-specific SSL.



- | | | |
|-----------------------|--------------------------|--|
| ■ Confirmation Sample | □ AOC Boundary - Active | ▨ Features |
| ≡ Railroads | □ AOC Boundary - NFA | ▨ Surface Soils Excavation (0-1 ft bls) |
| ≡ Fence | □ SWMU Boundary - Active | ▨ Intermediate Soil Excavation Area (1-3 ft bls) |
| ≡ Roads | □ Buildings | ▨ Subsurface Soil Excavation (1-5 ft bls) |
| ≡ Shoreline | □ Zone Boundary | ▨ 1998 Excavation Area (DET) |

Figure 7-1
Confirmation Sample Locations
AOCs 605 & 621 and SWMUs 5 & 18
Charleston Naval Complex

1 **8.0 Conclusions and Recommendations**

2 SWMU 5 is a former battery electrolyte treatment area adjacent to Pad 1278 and Dry Dock 4.
3 Associated with battery salvaging, restoring, and recharging operations, this site was used
4 to neutralize submarine battery acid from 1962 until 1985. It consisted of a battery
5 disassembly platform, two neutralization tanks, and customized transporting railcars.

6 SWMU 18 is a former polychlorinated biphenyl (PCB) spill area at the Public Works
7 Resource Recovery Facility Storage Area. In June 1987, a contractor was loading PCB-
8 containing items when a transformer broke and discharged approximately 75 gallons of
9 Pyranol insulating fluid onto the ground. Shortly thereafter soil excavation was conducted
10 to remediate the spill.

11 AOC 605 is a waste paint storage area adjacent to Dry Dock 4 on Pad 1278. The 40-ft by 250-
12 ft concrete pad was constructed in 1943 as a welding area. Since 1987, the pad has been used
13 to store materials such as paints, used oils, solvents, and chemicals.

14 AOC 621 comprises the battery cracking area associated with SWMUs 5 and 18 and AOC
15 605. The unit is a concrete pad surrounded by a 1 ft-high concrete containment wall. AOC
16 621 was used as a welding slab from the early 1940s until around 1950. From the early 1950s
17 to the mid-1970s this work area was used for wrecking submarine batteries, with operations
18 including cracking batteries and draining the acids to recover lead and container cells. A
19 collection sump drained acid from the pad to the neutralization facility.

20 The area of the CNC in which these sites are located is zoned M-2, heavy marine industrial.

21 The RFI performed by the Navy confirmed the presence of lead-impacted soil and
22 groundwater. An IM was performed by the DET for the Navy in 1998 to address lead-
23 impacted soil. An additional IM was performed by CH2M-Jones in 2002 to address
24 remaining lead contamination in soil.

25 Based on a review of site data and an evaluation of the risks posed by residual
26 concentrations of chemicals in soil and groundwater, the site is suitable for continued
27 industrial use, which is consistent with its current zoning status.

28 The following COCs were identified in soil at the site:

29 Surface soil: BEQs for the unrestricted and industrial land use scenarios; lead for the
30 unrestricted land use scenario.

- 1 No subsurface soil or groundwater COCs were identified.
- 2 A CMS is recommended to address these COCs. A CMSWP is included in Section 9.0.

1 **9.0 CMS Work Plan for Combined SWMU 5**

2 Based on an evaluation of residual soil concentrations, BEQs were identified as surface soil
3 COCs for the unrestricted and industrial land use scenarios and lead was retained as a
4 surface soil COC for the unrestricted land use scenario.

5 This CMSWP identifies preliminary remedial action objectives (RAOs) and MCSs for COCs
6 at Combined SWMU 5 as well as potential remedial alternatives for preventing
7 unacceptable exposure to COCs in surface soil. A CMS will be performed to evaluate
8 remedial alternatives for surface soil.

9 **9.1 Remedial Action Objectives**

10 RAOs are medium-specific goals that the remedial actions will be designed to accomplish in
11 order to protect human health and the environment by preventing or reducing exposures
12 under current and future land use conditions. The RAOs identified for surface soil at
13 Combined SWMU 5 are to prevent human receptor exposure to BEQs and lead in surface
14 soil.

15 **9.2 Remedial Goal Options and Proposed Media Cleanup** 16 **Standards**

17 Typically after RAOs have been established and the risk assessment is complete, remedial
18 goal options (RGOs) are developed for each RAO. The RGOs are based on assumptions
19 about a particular land use scenario and include different residual risk levels for
20 comparison. For example, to remediate surface soils to protect an onsite maintenance
21 worker, RGOs might include remediating to anthropogenic background levels or to one of a
22 variety of specific risk levels, such as 1E-06 or 1E-04. For each RGO, a specific MCS is
23 determined for specific chemicals. These MCSs are expressed in conventional concentration
24 units, such as mg/kg or milligrams per liter (mg/L), for specific chemicals. Remediating the
25 site to those specific MCSs would be suitable to demonstrate that the RAO has been
26 achieved.

27 The exposure medium of concern for Combined SWMU 5 is surface soil. Proposed MCSs for
28 achieving RGOs protective of potentially exposed human receptors are presented below.

1 Remedial alternatives for achieving these potential MCSs will be evaluated and described in
2 the CMS.

3 Preliminary recommendations for MCSs for site COCs are presented below:

4 <u>Surface Soil COC</u>	<u>Preliminary MCS (mg/kg)</u>
5 Lead	400 (for unrestricted land use)
6 BEQs	1.304 (CNC Sitewide Reference Concentration)

7 **9.3 Corrective Measures Evaluation**

8 The CMS will evaluate options for preventing unacceptable exposure to surface soil COCs.
9 Potential approaches to achieving the MCS in soil include LUCs and soil excavation and
10 disposal.

11 **9.4 CMS Approach**

12 The CMS will consist of the following three tasks.

- 13 1. Candidate corrective measure alternatives will be screened using several criteria and
14 decision factors.
- 15 2. A preferred corrective measure alternative will be selected for each medium.
- 16 3. The CMS and preferred corrective measure alternatives will be documented in the CMS
17 report.

18 **9.5 Approach to Evaluating Corrective Measure Alternatives**

19 According to the RCRA permit issued by SCDHEC (SCDHEC, 1998), the alternatives will be
20 evaluated using the following five standards:

- 21 1. Protect human health and the environment.
- 22 2. Attain MCSs (RGOs).
- 23 3. Control the source of releases to minimize future releases that may pose a threat to
24 human health and the environment.
- 25 4. Comply with applicable standards for the management of wastes generated by remedial
26 activities.

5. Other factors include (a) long-term reliability and effectiveness; (b) reduction in toxicity, mobility, or volume of wastes; (c) short-term effectiveness; (d) implementability; and (e) cost.

Each of the five criteria is defined in more detail below:

1. **Protect human health and the environment.** The alternatives will be evaluated on the basis of their ability to protect human health and the environment. The ability of an alternative to achieve this standard may or may not be independent of its ability to achieve the other standards. For example, an alternative may be protective of human health, but may not be able to attain the MCSs, if the MCSs are not directly tied to protecting human health.
2. **Attain MCSs (RGOs).** The alternatives will be evaluated on the basis of their ability to achieve the RGOs defined in this CMSWP. Another aspect of this is the time frame to achieve the RGOs. Estimates of the time frame for the alternatives to achieve RGOs will be provided.
3. **Control the source of releases.** This deals with the control of releases of contamination from the source (the area or material from which the contamination originated).
4. **Comply with applicable standards for the management of wastes.** This deals with the management of wastes derived from implementing the alternatives, e.g., treatment or disposal of excavated material. The removal alternative will be designed to comply with all standards for management of wastes.
5. **Other factors.** Five other factors must be considered if an alternative is found to meet the four criteria described above. These other factors are as follows:
 - a. **Long-term reliability and effectiveness**

These two alternatives will be evaluated on the basis of their reliability and the potential impact should the alternative fail. In other words, a qualitative assessment will be made as to the chance of the alternative's failing and the consequences of that failure.
 - b. **Reduction in the toxicity, mobility, or volume of wastes**

Alternatives with technologies that reduce the toxicity, mobility, or volume of the contamination will be generally favored over those that do not. Consequently, a qualitative assessment of this factor will be performed for each alternative.

1 **c. Short-term effectiveness**

2 Alternatives will be evaluated on the basis of the risk they create during the
3 implementation of the remedy. Factors that may be considered include fire,
4 explosion, and exposure of workers to hazardous substances.

5 **d. Implementability**

6 The alternatives will be evaluated for their implementability by considering any
7 difficulties associated with conducting the alternatives (such as the construction
8 disturbances they may create), operation of the alternatives, and the availability of
9 equipment and resources to implement the technologies comprising the alternatives.

10 **e. Cost**

11 A net present value of each alternative will be developed. These cost estimates will
12 be used for the relative evaluation of the alternatives, not to bid or budget the work.
13 The estimates will be based on information available at the time of the CMS and on a
14 conceptual design of the alternative. They will be "order of magnitude" estimates
15 with a generally expected accuracy of -50 percent to +50 percent for the scope of
16 action described for each alternative. The estimates will be categorized into capital
17 costs and operations and maintenance costs for each alternative.

18 **9.6 CMS Report**

19 The CMS Report will present the identification, development, and evaluation of potential
20 corrective measures for Combined SWMU 5. A proposed outline of the report, as shown in
21 Table 9-1, provides an example of the report format and content organization.

TABLE 9-1

Outline of CMS Report for Combined SWMU 5

RFI Report Addendum/IM Completion Report/CMS Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

Section No.	Section Title
1.0	Introduction
1.1	Corrective Measures Study Purpose and Scope
1.2	Report Organization
1.3	Background Information
1.3.1	Facility Description
1.3.2	Site History and Background
1.3.2.1	Nature and Extent of Contamination
1.3.2.2	Summary of Risk Assessment
2.0	Remedial Goal Options
3.0	Detailed Analysis of Focused Alternatives
3.1	Approach
3.2	Evaluation Criteria
3.3	Description of Soil Alternatives ^a
3.3.1	Alternative 1: Land Use Controls
3.3.2	Alternative 2: Soil Removal and Disposal
3.4	Comparative Analysis of Soil Alternatives
4.0	Recommended Remedial Alternatives
5.0	References
Appendix A	Corrective Measure Alternative Cost Estimates^b
List of Tables	
List of Figures	
^a	Additional alternatives will be analyzed, if necessary.
^b	Additional appendices will be added, if necessary.

1 10.0 References

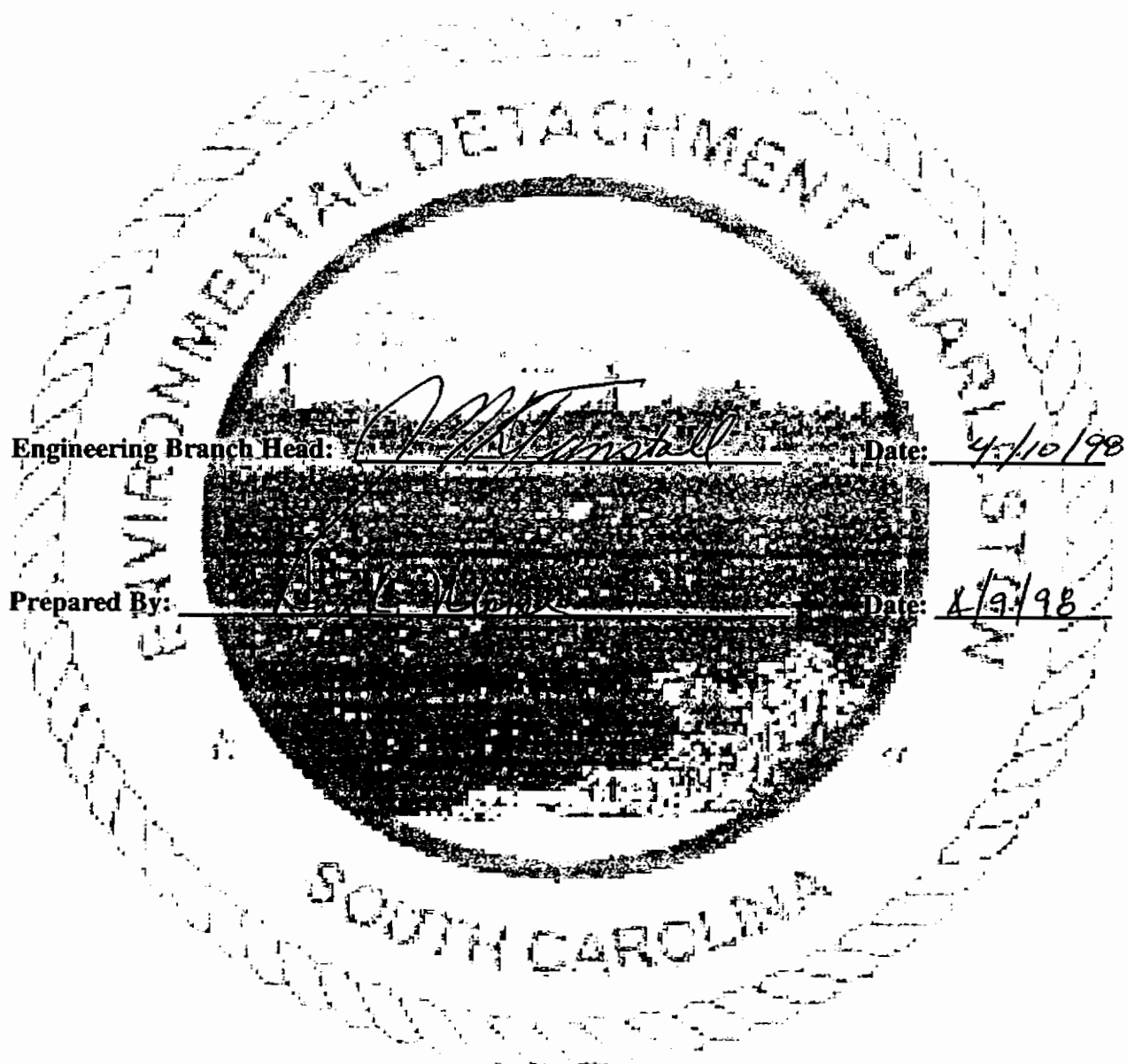
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Appendix A

COMPLETION REPORT

Interim/Stabilization Measure for
SWMU 5, AOC 605 & AOC 621
Charleston Naval Complex, Charleston, SC



REPORT GENERATED BY:
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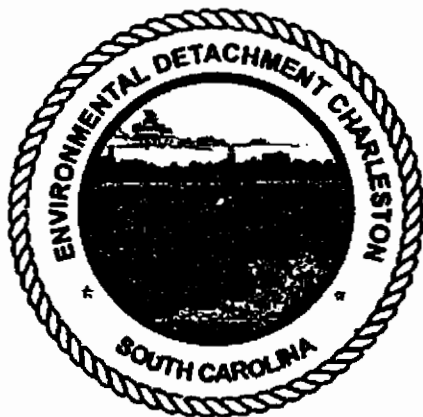
COMPLETION REPORT

INTERIM/STABILIZATION MEASURE FOR
SWMU 5, AOC 605 & AOC 621
BATTERY WRECKING/SALVAGE AREA
NAVAL BASE CHARLESTON
CHARLESTON, SC



Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON SC



Prepared by:

Supervisor of Shipbuilding, Conversion and Repair,
USN, (SUPSHIP) Portsmouth Va.,
Environmental Detachment Charleston, S.C.
1899 North Hobson Ave.
North Charleston, SC 29405-2106

April 10, 1998

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Table of Contents	ii
List of Tables	iii
List of Figures	iii
List of Appendices	iv
Acronyms, Abbreviations and Symbols	v
1. Introduction	1-1
1.1 Installation Restoration Program	1-1
1.1.1 Naval Base Charleston Installation Restoration Program	1-1
1.2 Interim Measures	1-1
1.3 Solid Waste Management Unit 5 and Areas of concern 605 & 621	1-1
1.4 Solid Waste Management Unit 5 and Areas of concern 605 & 621 Interim Measure	1-3
2. Interim Measure Execution	2-1
2.1 Actions Required by Interim Measure Work Plan	2-1
2.1.1 Soil Excavation	2-1
2.1.2 Monitoring Well Abandonment	2-1
2.1.3 Flushing of Acid Drain Piping	2-1
2.1.4 Removal of Acid Drain Piping	2-2
2.2 Observations Noted	2-2
2.3 Plan Modifications and Justification	2-2
2.3.1 Volume of Excavated Soil	2-2
2.3.2 Relocation of Building 1435	2-3
2.3.3 Removal and Reinstallation of Battery Crane	2-3
2.3.4 Backfilling of the Excavation	2-3

TABLE OF CONTENTS (cont'd)

<u>Section</u>	<u>Page</u>
3. Interim Measure Outcome	3-1
3.1 Site Conditions Following Completion of Work	3-1
4. Sampling	4-1
4.1 Sampling Evolutions and Results	4-1
4.1.1 Confirmatory Sampling	4-1
4.1.2 Investigatory Sampling	4-1
5. Waste Generation	5-1
5.1 Hazardous/Potentially Hazardous Waste	5-1
5.1.1 Hazardous Excavated Soil	5-1
5.2 Non-Hazardous Waste	5-1
5.2.1 Non-Hazardous Excavated Soil	5-1

LIST OF TABLES

Table A	SWMU 5 & AOC 605 Investigatory (RFI) Soil Sample Results	A-1
Table B	DET Sample Results	A-5
Table C	SWMU 18 Investigatory (RFI) Soil Sample Results	A-13
Table D	SWMU 5 Hazardous Waste Disposal Information Spreadsheet	A-14

LIST OF FIGURES

Figure 1	Site Map with RFI Sample Locations	B-1
Figure 2	Site Map with Drain Piping, SWMU 18 & Original Areas of Excavation	B-2
Figure 3	Site Map with Actual Initial Excavation Boundary	B-3
Figure 4	Site Map with Initial Excavation Boundary & 1 st Round Samples	B-4
Figure 5	Site Map with Initial Excavation Boundary & Additional 1 st Round Samples .	B-5
Figure 6	Site Map with 1 st Additional Excavation Boundary & 2 nd Round Samples	B-6

TABLE OF CONTENTS (cont'd)

<u>Section</u>	<u>Page</u>
----------------	-------------

LIST OF FIGURES (cont'd)

Figure 7	Site Map with 2 nd Additional Excavation Boundary & 3 rd Round Samples . . .	B-7
Figure 8	Site Map with 3 rd Additional Excavation Boundary & 4 th Round Samples	B-8
Figure 9	Site Map 4 th Additional Excavation Boundary & 5 th Round Samples	B-9
Figure 10	3-D Topographic Site Map of Finished Excavation	B-10

LIST OF APPENDICES

Appendix A	Tables	Tab 1
Appendix B	Site Maps	Tab 2
Appendix C	Sampling Documentation	Tab 3
Appendix D	Waste Documentation	Tab 4
Appendix E	Miscellaneous Documentation	Tab 5
Appendix F	Photographs	Tab 6

ACRONYMS, ABBREVIATIONS and SYMBOLS

AOC	Area of Concern
CMS	Corrective Measures Study
COPC	Constituent of Potential Concern
DERP	Defense Environmental Restoration Program
DET	Environmental Detachment Charleston
DON	Department of the Navy
IM	Interim Measure
IR	Installation Restoration
mg/kg	milligrams per kilogram (equal to parts per million)
PCB	Polychlorinated Biphenyls
ppm	Parts Per Million
PT	Project Team
PVC	Polyvinyl Chloride
RBC	Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
ROC	Run of Crusher (crushed aggregate)
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SUPSHIP	Supervisor of Shipbuilding, Conversion and Repair, USN
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	United States Environmental Protection Agency
USN	United States Navy
$\mu\text{g/kg}$	micrograms per kilogram (equal to parts per billion)

1. INTRODUCTION

1.1 INSTALLATION RESTORATION PROGRAM. The purpose of the Department of the Navy (DON) Installation Restoration (IR) Program is to identify, assess, characterize and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at Navy and Marine Corps activities. The Defense Environmental Restoration Program (DERP) is codified in the Superfund Amendments and Reauthorization Act (SARA) Section 211 (10 USC 2701). The IR Program is a component of DERP.

1.1.1 Naval Base Charleston IR Program. At Naval Base Charleston, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was prepared which divided the Naval Base into zones and identified Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) within each zone. The RFA evaluated each SWMU and AOC and determined which sites required further investigation. Based on the RFA, a RCRA Facility Investigation (RFI) work plan has been or is being prepared for each zone containing SWMUs and AOCs requiring further investigation. On completion of the RFI for each Zone, a RFI report will be prepared for that zone. The RFI reports will identify SWMUs and AOCs containing wastes requiring remediation. Eventually, Corrective Measures Studies (CMSs) will be prepared to determine the best means of remediating each site.

1.2 INTERIM MEASURES. Interim Measures (IM) performed as part of the IR Program are intended to eliminate sources of environmental contamination or limit the spread of environmental contaminants prior to the completion of the RFI CMSs.

1.3 SOLID WASTE MANAGEMENT UNIT 5 AND AOCs 605 & 621. SWMU 5, AOC 605 and AOC 621, all located in Zone "E", were associated with submarine battery salvaging, restoring and recharging operations including battery wrecking, draining of the acid, neutralization of the acid and processing/storage of salvaged battery materials. Subsequent to battery processing operations, AOC 605 was also used as a waste paint storage area.

SWMU 5 is the former battery electrolyte treatment facility (structure #1797) located on the south side of Pad 1278 and adjacent to dry dock #4. This site operated from 1962 until 1985 and was used to neutralize submarine battery acid. This site consists of two partially subsurface neutralization pits and associated piping.

AOC 605 is a former waste paint storage area adjacent to dry dock 4 on Pad 1278. The 40 feet by 250 feet uncovered concrete pad was constructed in 1943 as a welding area. Beginning in 1987, the pad was used for storage of materials such as paints, used oils, solvents and chemicals. The pad is bordered to the south and west by unpaved areas.

AOC 621 is the former battery wrecking pad associated with the Battery Shop. This site consists of a concrete pad approximately 10' x 10' surrounded by a 1' concrete containment wall with a collection sump and drain piping to the neutralization pits. This battery wrecking pad is constructed on top of Pad 1278 near the southeast corner. This site operated from the early 1950's until the mid 1970's and was used for cracking submarine batteries, draining the acid and recovering the battery casings and lead.

The waste materials associated with SWMU 5 and AOC 621 were generated from batteries. The Constituents of Potential Concern (COPCs) associated with these two sites include solvents, acids and heavy metals (particularly lead).

The waste materials associated with AOC 605 were generated primarily from paints and solvents. The COPCs associated with this site also include solvents, acid and lead as well as petroleum hydrocarbons.

The primary migration pathways at all of these sites are soil and groundwater, both of which were selected for sampling under the Zone "E" RFI Work Plan. Soil contamination to groundwater is expected. Refer to TABLE A of Appendix A for a tabulation of all SWMU 5 and AOC 605 RFI soil sample analytical results which exceed the United States Environmental Protection Agency (USEPA) Region III Risk Based Concentration (RBC) Table levels.

Because of the close physical proximity of these three sites, they were grouped for investigative purposes and were also grouped for the purpose of IM remedial actions. Refer to **FIGURE 1** of Appendix B for the location and relationship of these three sites and the RFI soil sample locations.

1.4 SWMU 5, AOC 605 & AOC 621 INTERIM MEASURE. During the interval between the RFI and the completion of the CMS, it was decided by Southern Division Naval Facilities Engineering Command (SOUTHDIV) that an IM would be performed by Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP), United States Navy (USN), Portsmouth Va. Environmental Detachment Charleston (DET). The objective of this IM was to stabilize the site by removing lead contaminated soils from the area around SWMU 5, AOC 605 and AOC 621 until the sampling program indicated with reasonable confidence that the concentration of lead at the site was less than 1300 parts per million (ppm). This was the total lead concentration target level established for this IM based on intended industrial reuse of the site. Groundwater remediation was not an objective of this IM and, as previously stated, no remedial action was intended for the neutralization pits, the wrecking pad or pad 1278 since these structures were not considered sources for hazardous constituents. This IM was consistent with the ultimate cleanup of the site and was not intended to circumvent the public participation process inherent within environmental cleanup under RCRA authority.

The results of investigatory samples taken by the DET indicate that the acid neutralization pits as well as the battery wrecking pad should not be considered as sources for hazardous constituents. Refer to **TABLE B** of Appendix A for a tabulation of sample information, including analytical results. Although no samples were collected by the DET from pad 1278, this pad was also not considered as a source for hazardous constituents since only thoroughly dried paint remains adhered to the pad surface. Consequently, no IM remedial action was intended for the neutralization pits, the wrecking pad or pad 1278.

It should be noted that SWMU 18 is also in the immediate vicinity of the three previously mentioned sites and consists of a former 20' x 20' Polychlorinated Biphenyl (PCB) spill area at the Public Works

Resource Recovery Facility Storage Area. Refer to **FIGURE 2** of Appendix B for the location of SWMU 18. The spill, which occurred in 1987, resulted in the release of approximately 75 gallons of Pyranol fluid to the soil. This site was reported to be completely remediated in Section 2.6.18 of the KEMRON Environmental Services, Inc. RFI Final Report dated September, 1991 and subsequent sample results from the Ensafe/Allen & Hoshall Final Zone E RFI Work Plan dated 2 June, 1995 also indicate PCBs are no longer present. Therefore, no remedial action for PCBs was intended by this IM. However, since SWMU 18 samples taken by EnSafe did reflect elevated concentrations of lead, this area will be included in the excavation. Refer to **TABLE C** of Appendix A for a tabulation of all SWMU 18 RFI soil sample analytical results which exceed RBC Table levels.

2. INTERIM MEASURE EXECUTION

2.1 ACTIONS REQUIRED BY INTERIM MEASURE WORKPLAN.

2.1.1 Soil Excavation. The work plan required the excavation of lead contaminated soil from three isolated locations at the site. Based on RFI sampling, these locations contained elevated concentrations of lead (>1300 ppm) at interval 1 (0 to 1 foot deep). These locations are labeled as sample numbers 005SB002, 605SB002 and 018SB004 in **FIGURE 1** of Appendix B and were identified as areas to be excavated in **FIGURE 2** of Appendix B. Initial excavation at each of these three isolated areas was to consist of removing the top 2 feet of soil from a rectangular area approximately 6 feet by 6 feet. Based on the results of screening samples, the excavations could be expanded up to an area approximately 10 feet by 10 feet by 3 feet deep. The work plan required an engineering evaluation and SOUTHDIV concurrence for any further excavation expansion. All soil excavated from this site was placed in appropriate disposal containers. Based on screening samples and SOUTHDIV concurrence, the final excavation measured approximately 30 feet wide by 70 feet long by 4-1/2 feet deep as discussed in paragraph 2.3.1 of this report.

2.1.2 Monitoring Well Abandonment. Monitoring well 605GW002 existed at SWMU 5 at sample location 605SB002. The work plan required abandonment of this well prior to commencing excavation at the site and fourth quarter groundwater sampling at this well was complete prior to abandonment. Abandonment of this well was completed on March 14, 1997. A copy of the letter notifying the South Carolina Department of Health and Environmental Control (SCDHEC) of abandonment of this well is included in Appendix E.

2.1.3 Flushing of Acid Drain Piping. The work plan required a low pressure, fresh water flush of one 2 inch and one 4 inch, subsurface, polyvinyl chloride (PVC) acid drain line. Refer to **FIGURE 2** of Appendix B for the location and routing of this piping. Flushing of these acid drain lines was to continue until a pH value of between 5.0 and 9.0 was obtained at the flushing outlet. All flushing water was to be collected, sampled, characterized and properly disposed. Flushing was completed on March 5, 1997. A copy of the pH test results for the flushing water is included in Appendix E.

2.1.4 Removal of Acid Drain Piping. Subsequent to satisfactory flush, the work plan required excavation, removal and proper disposal of a section of the 2 inch piping from the neutralization pit to the southwest perimeter boundary fence along River Road as well as all of the 4 inch piping from the neutralization pit to the wrecking pad. Refer to **FIGURE 2** of Appendix B for the location and routing of this piping. Removal of all acid drain piping was completed on March 7, 1997.

2.2 OBSERVATIONS NOTED. No unexpected or unusual circumstances were observed during execution of the work plan.

2.3 PLAN MODIFICATIONS AND JUSTIFICATION.

2.3.1 Volume of Excavated Soil. The volume of soil to be excavated during this project was originally estimated to be between 8 cubic yards (3 rectangular areas, 6 feet x 6 feet x 2 feet deep) and 33 cubic yards (3 rectangular areas, 10 feet x 10 feet x 3 feet deep) as described in Section 4 of the IM work plan. However, in early 1997 it was decided by the Project Team (PT) that initial excavation would consist of removing all of the soil, down to second interval depth (3-5 feet deep), along the northwest side of Building 1435 (up to pad 1278) and across the southwest end of Building 1435 (up to the fence). Refer to **FIGURE 3** of Appendix B for an illustration of the initial excavation boundary.

Subsequent to the initial excavation described in the previous paragraph, several evolutions of additional excavation, followed by additional sampling, were necessary to accomplish the objective of the IM as stated in the opening paragraph of Section 1.4 of this report. The excavation boundary, or portions of it, was expanded a total of four times with a total of five rounds of corresponding investigatory and/or confirmatory sampling. Refer to **FIGURE 4** through **FIGURE 9** of Appendix B for an illustration of the sequence of changes to the excavation boundary and the corresponding sample locations. Appendix F includes photographs taken during excavation operations at the site. The combined total volume of soil excavated from the SWMU 5 site was 1,019,680 pounds (509.84 tons) or 339.89 cubic yards based on 1.5 tons per cubic yard. Refer to **FIGURE 10** of Appendix B

for a 3-D topographic site map of the finished excavation which measured approximately 30 feet wide by 70 feet long by 4-1/2 feet deep.

2.3.2 Relocation of Building 1435. Based on unsatisfactory results of first round confirmatory samples collected immediately adjacent to the northwest side of Building 1435, relocation of this building was necessary to facilitate additional investigatory sampling and subsequent additional excavation of soil under the building.

2.3.3 Removal and Reinstallation of the Battery Crane. Based on unsatisfactory results of second round confirmatory samples collected immediately adjacent to the northeast side of the battery crane foundation, temporary removal of the battery crane was necessary to facilitate the safe excavation of soil under the battery crane foundation. It should be noted here that four concrete pilings were unearthed during removal of the soil under the battery crane foundation and that these pilings, not the soil, provide all the support for the battery crane. The battery crane was reinstalled after receiving satisfactory results of fifth round confirmatory samples and prior to backfilling of the excavation.

2.3.4 Backfilling of the Excavation. As previously stated, backfilling of the SWMU 5 excavation was not originally intended. However, due to the substantial increase in volume of excavated soil, backfilling became necessary. For informational purposes, the DET requested further analysis of soil from two of the fourth round confirmatory samples to determine the concentration of leachable lead in the soil. The Toxicity Characteristic Leaching Procedure (TCLP) result on the first sample, which had 2150 ppm total lead, was 26.6 ppm. The TCLP result on the second sample, which had 4620 ppm total lead, was 81.1 ppm. Refer to TABLE B of Appendix A for a tabulation of sample information, including analytical results. Based on this information, SOUTHDIV requested that a 1 foot layer of soil/lime mix, at a 1/1000 ratio, be spread into the bottom of the excavation prior to filling the excavation with clean fill. This was intended to help precipitate the leachable (soluble) lead out of the soil to further stabilize the site. Based on the total volume of excavated soil reported

in Section 2.3.1 of this report and allowing 25% for compaction, a total of 437 cubic yards of backfill was required for the SWMU 5 excavation.

3.0 INTERIM MEASURE OUTCOME

3.1 SITE CONDITIONS FOLLOWING COMPLETION OF WORK. Following completion of all site work on 13 January 1998, the site was clean and well groomed. The overall general shape and slope of the site remained the same as it was prior to the start of the IM. Monitoring well 605GW002 is no longer present on the southwest end of the excavated area and Building 1435 is no longer present on the southeast side of the excavated area. The battery crane, which was temporarily removed, was restored to its original location. The soil immediately adjacent to pad 1278 is now even with the bottom of the pad, whereas prior to the IM it was several inches below the bottom of the pad. This was done intentionally to allow for some additional compaction and settling. The original surface of the site consisted of weeds growing in Run of Crusher (ROC) and coarse crushed granite. Grass seed was not cast onto the backfilled area.

4. SAMPLING

4.1 SAMPLING EVOLUTIONS AND RESULTS

4.1.1 Confirmatory Sampling. A total of 72 confirmatory samples were collected by the DET throughout the course of this IM. All of these were soil samples which were collected during excavation operations. Refer to **TABLE B** of Appendix A for a tabulation of sample information, including analytical results. Refer to Appendix C for copies of the analytical data and the Chain of Custody Records for all samples.

4.1.2 Investigatory Sampling. A total of 21 investigatory samples were collected by the DET throughout the course of this IM. Refer to **TABLE B** of Appendix A for a tabulation of sample information, including analytical results. Refer to Appendix C for copies of the analytical data and the Chain of Custody Records for all samples. The DET investigatory samples include the following:

- 1 water sample collected from each side of the divided acid neutralization pit and analyzed for total metals and pH (pH test performed by the DET);
- 1 concrete (pulverized) sample collected from the bottom of the battery wrecking pad which was also analyzed for total metals;
- 16 first round soil samples collected during excavation operations, following removal of Building 1435, and analyzed for total lead;
- 2 fourth round soil samples which were further analyzed for leachable lead concentration.

Investigatory sampling was also performed by Ensafé as part of the RFI process prior to the start of this IM. Refer to **TABLE A & TABLE C** of Appendix A for a tabulation of all SWMU 5 & AOC 605 and SWMU 18 RFI soil sample analytical results which exceed the USEPA Region III RBC table levels.

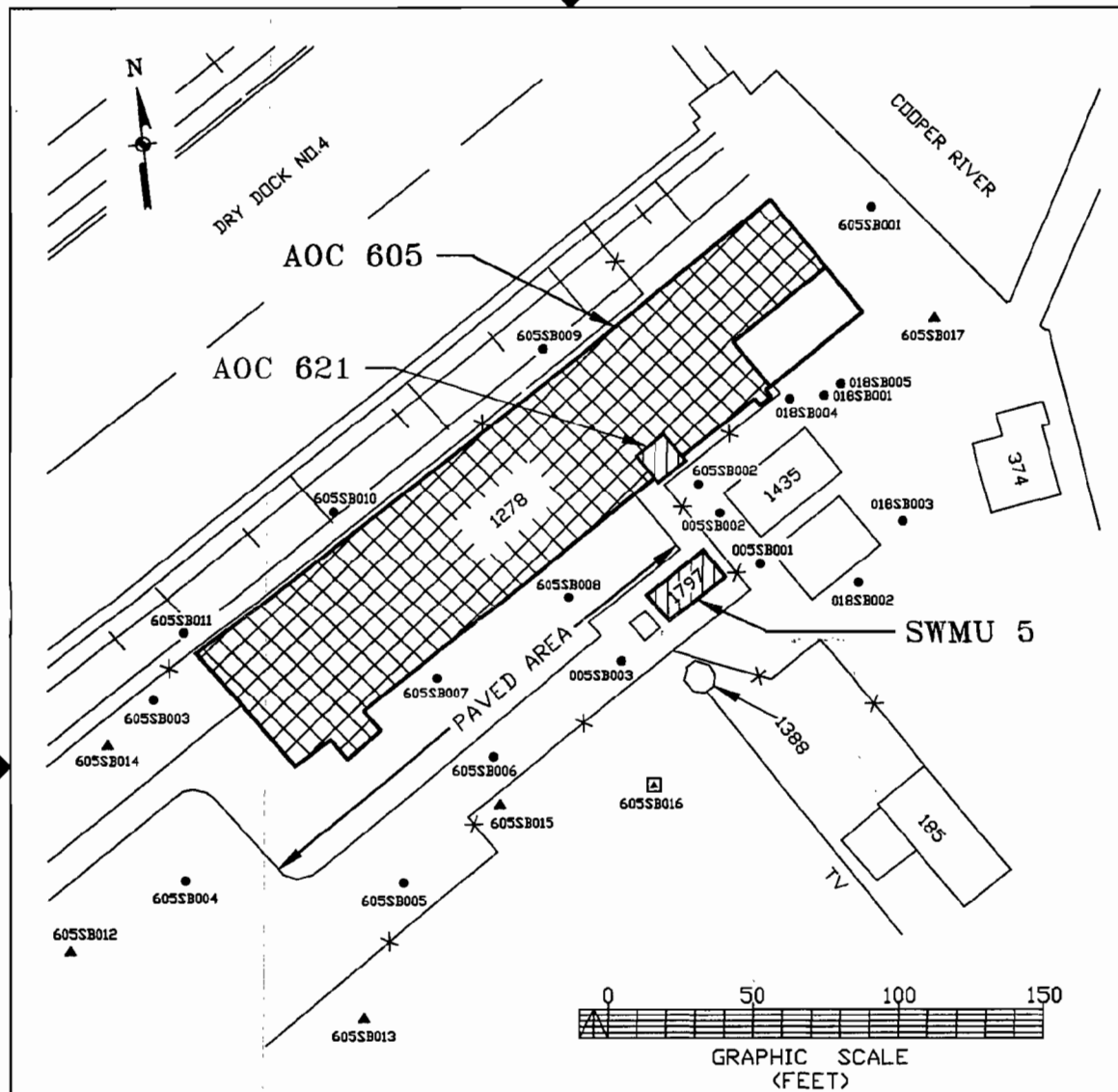
5. WASTE GENERATION

5.1 HAZARDOUS/POTENTIALLY HAZARDOUS WASTE

5.1.1 Hazardous Excavated Soil. Between 31 March 1997 and 15 December 1997, a total of 1,019,680 pounds (509.84 tons) of hazardous lead contaminated soil was transported by Laidlaw Environmental Services of South Carolina, Inc. from the SWMU 5 site to Pinewood Landfill located at Rt. 1, Box 255, Pinewood, South Carolina, 29125 under contract number N62467-97-M-4411. Refer to **TABLE D** of Appendix A for a tabulation of information regarding transportation/disposal of this waste. Refer to Appendix D for copies of all shipping manifests for this waste.

5.2 NON-HAZARDOUS WASTE

5.2.1 Non-Hazardous Excavated Soil. There was no non-hazardous soil excavated from the SWMU 5 site during this IM.



NOTES:

- FIRST ROUND RFI SOIL SAMPLE LOCATIONS WITH LEAD CONCENTRATIONS GREATER THAN 1300 PPM.
- FIRST ROUND RFI SOIL SAMPLE LOCATIONS WITH LEAD CONCENTRATIONS LESS THAN 1300 PPM.
- ▲ SECOND ROUND RFI SOIL SAMPLE LOCATIONS WITH LEAD CONCENTRATIONS LESS THAN 1300 PPM.
- ◻ SECOND ROUND RFI SOIL SAMPLE LOCATIONS. ANALYTICAL DATA NOT YET AVAILABLE.



ENVIRONMENTAL DETACHMENT CHARLESTON
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NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

DRAWING TITLE

FIGURE 1

SWMU 5 COMPLETION REPORT
SITE MAP WITH RFI SAMPLE LOCATIONS

SIZE
A

DATE
03-19-98

PREPARED BY

D. R. MORSE

REV

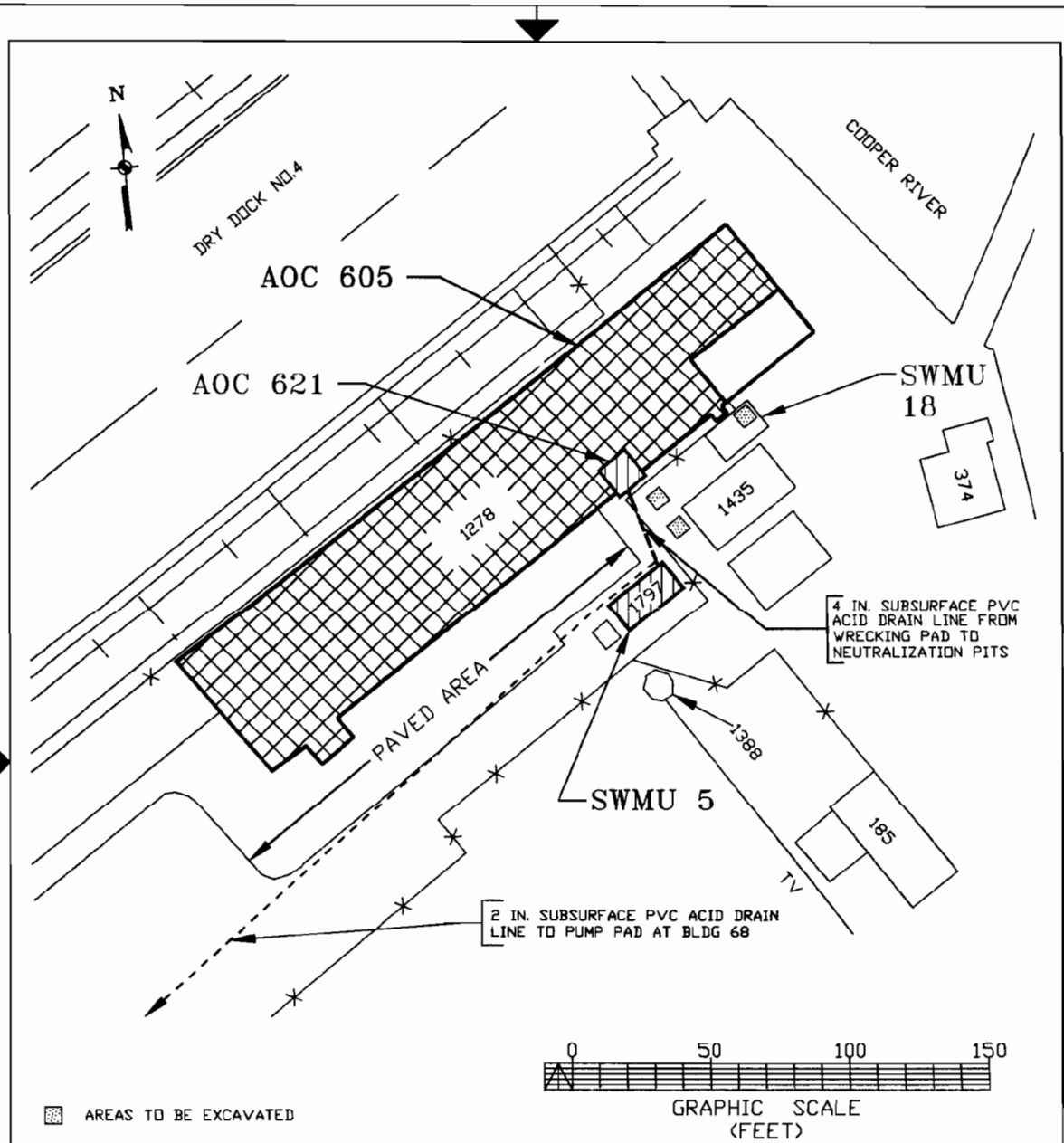
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SCALE

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SHEET

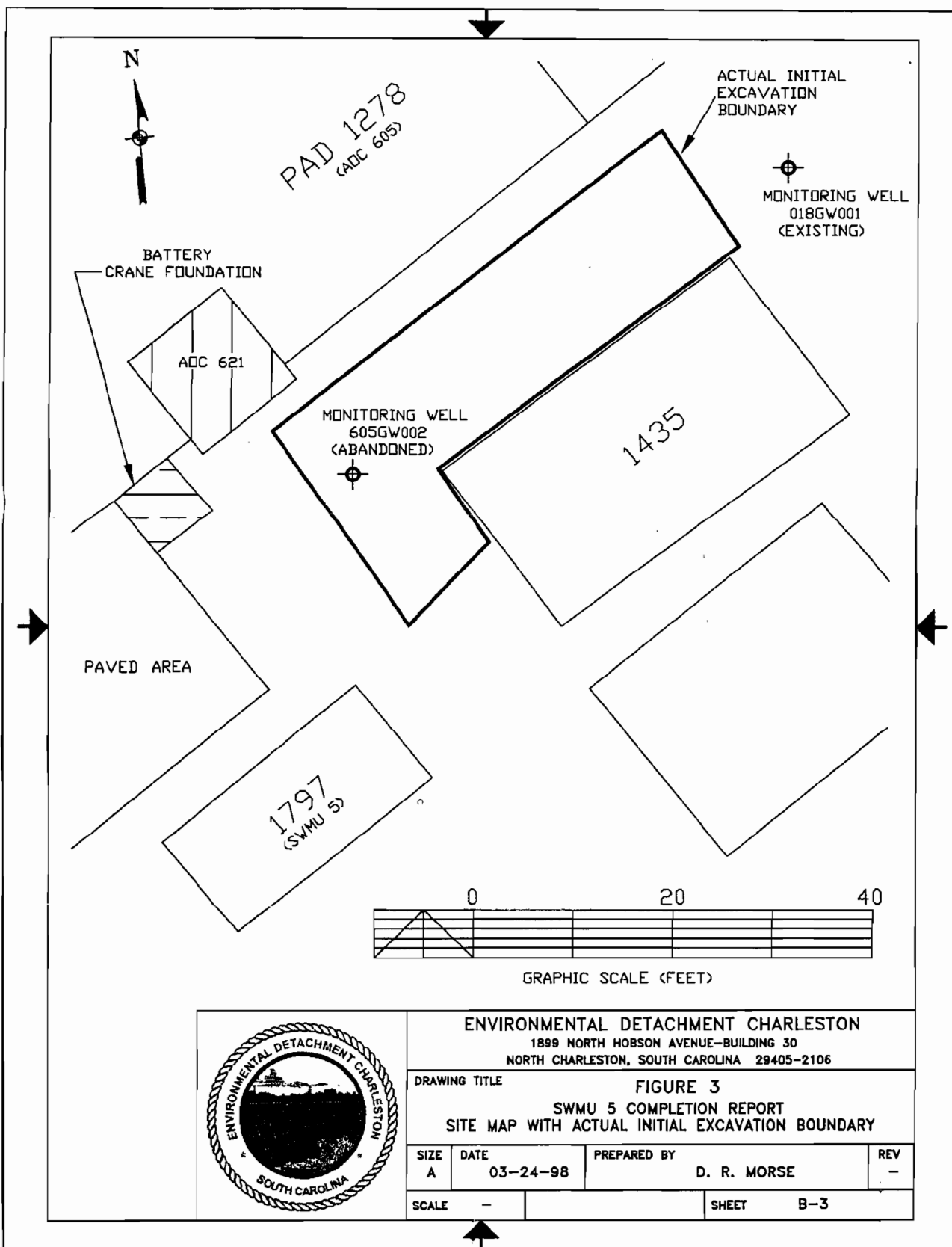
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ENVIRONMENTAL DETACHMENT CHARLESTON
1899 NORTH HOBSON AVENUE-BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

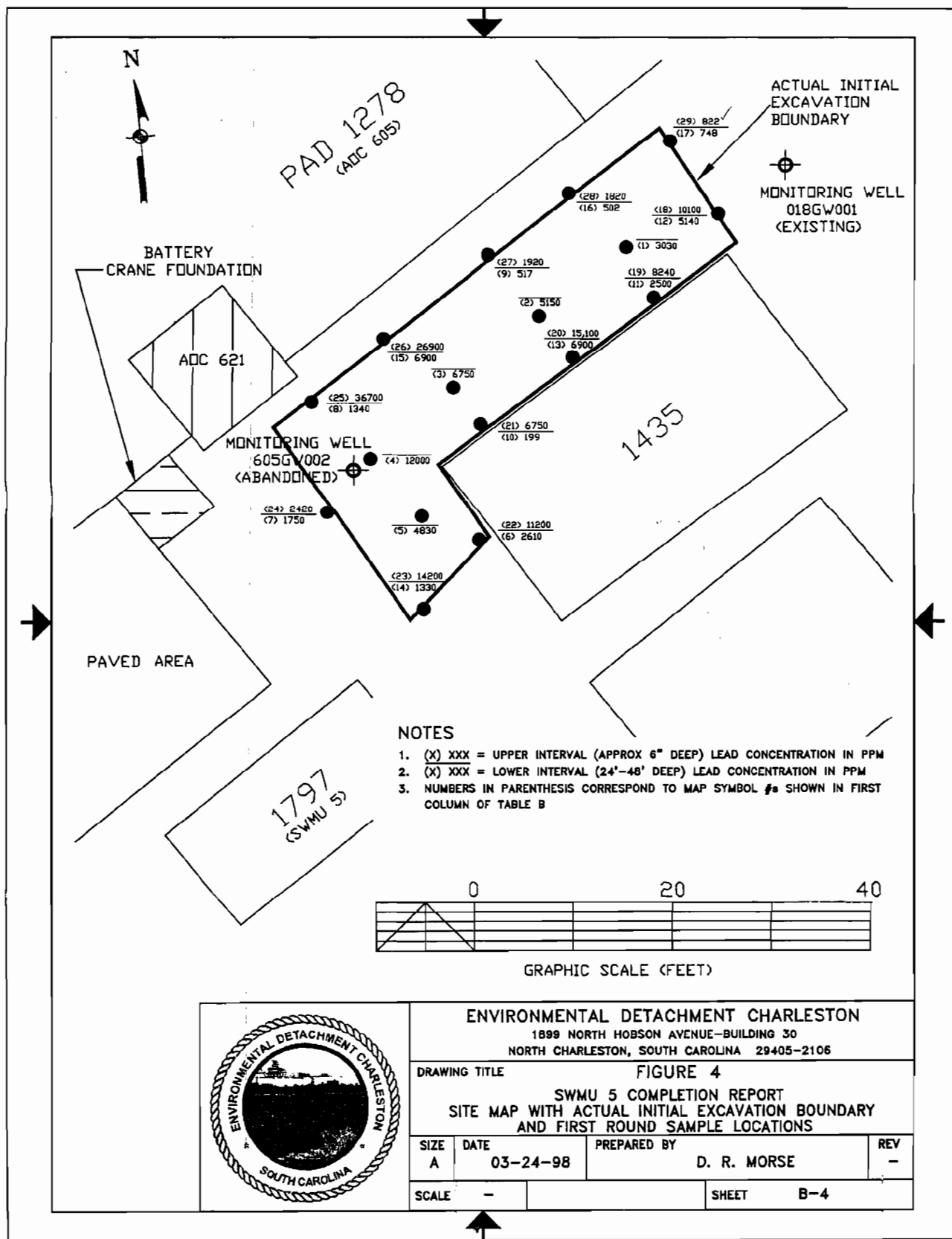
DRAWING TITLE
FIGURE 2
SWMU 5 COMPLETION REPORT
SITE MAP WITH DRAIN PIPING, SWMU 18
& ORIGINAL AREAS OF EXCAVATION

SIZE A	DATE 03-19-98	PREPARED BY D. R. MORSE	REV -
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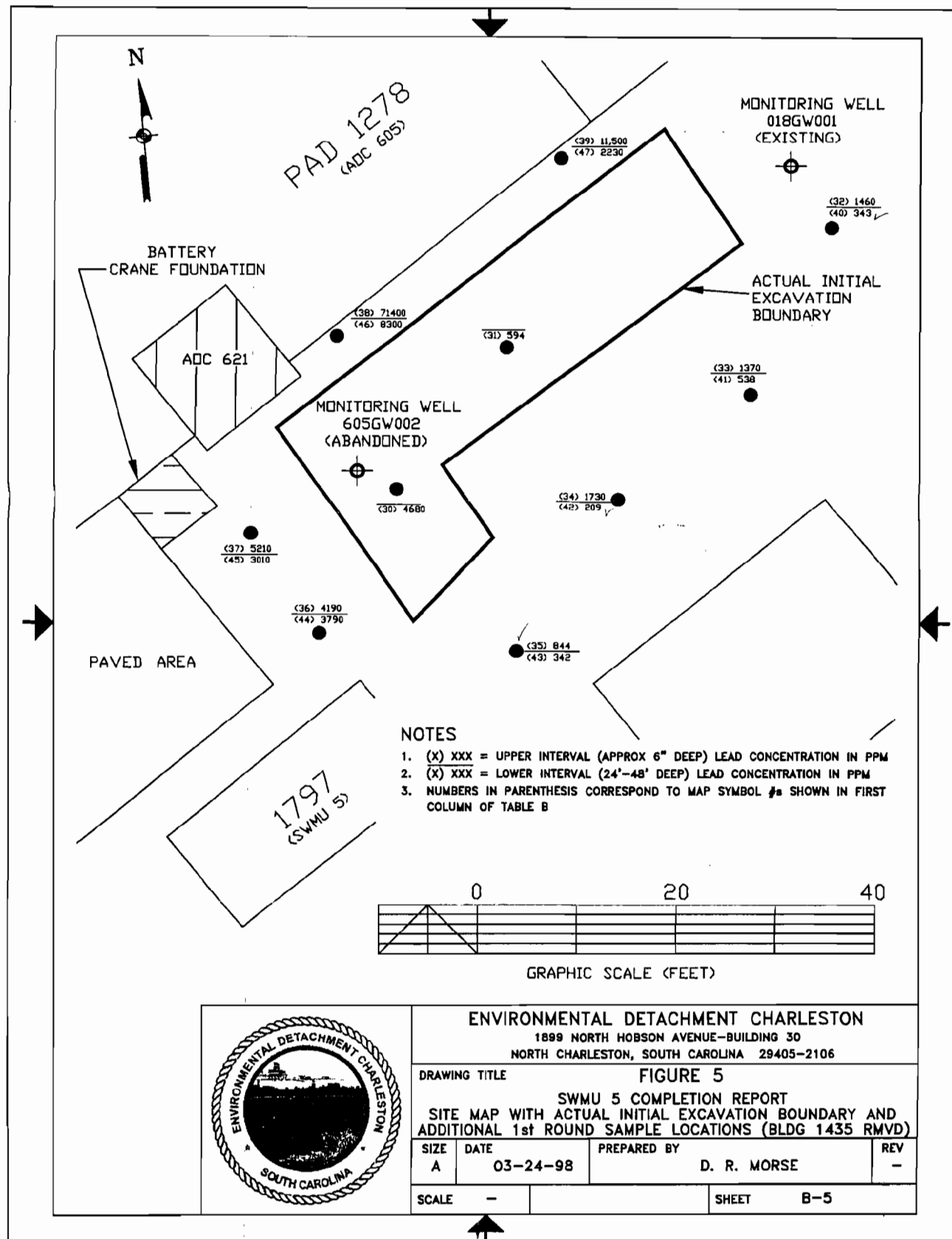


ENVIRONMENTAL DETACHMENT CHARLESTON 1899 NORTH HOBSON AVENUE-BUILDING 30 NORTH CHARLESTON, SOUTH CAROLINA 29405-2106			
DRAWING TITLE FIGURE 3 SWMU 5 COMPLETION REPORT SITE MAP WITH ACTUAL INITIAL EXCAVATION BOUNDARY			
SIZE A	DATE 03-24-98	PREPARED BY D. R. MORSE	REV -
SCALE -		SHEET B-3	

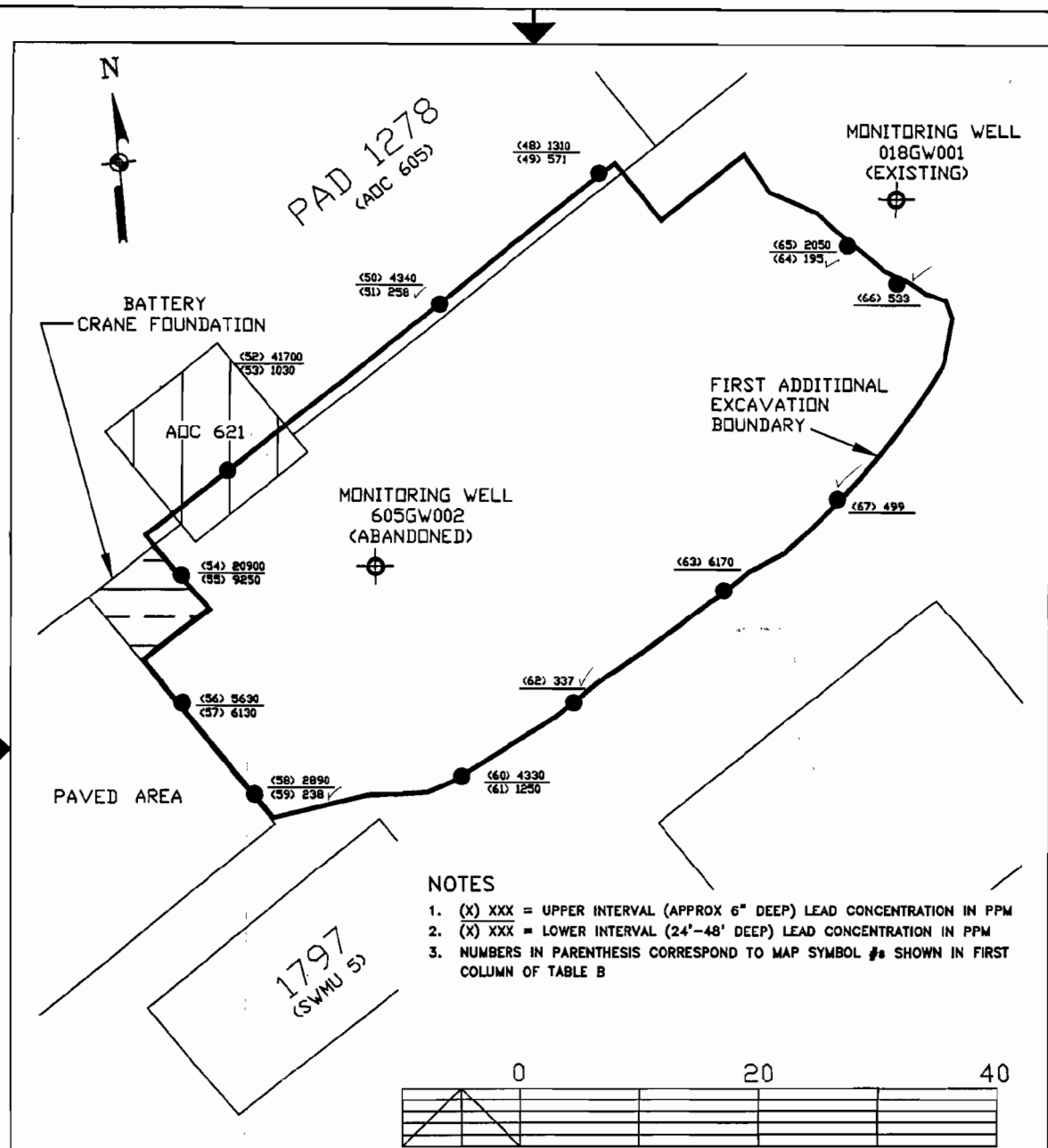
sampling done in '97



sample done in 1977

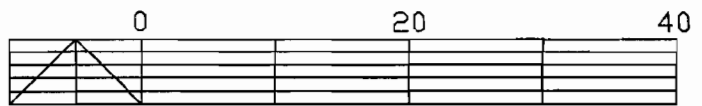


Sampling done in '97



NOTES

1. (X) XXX = UPPER INTERVAL (APPROX 6" DEEP) LEAD CONCENTRATION IN PPM
2. (X) XXX = LOWER INTERVAL (24"-48" DEEP) LEAD CONCENTRATION IN PPM
3. NUMBERS IN PARENTHESIS CORRESPOND TO MAP SYMBOL #s SHOWN IN FIRST COLUMN OF TABLE B



GRAPHIC SCALE (FEET)

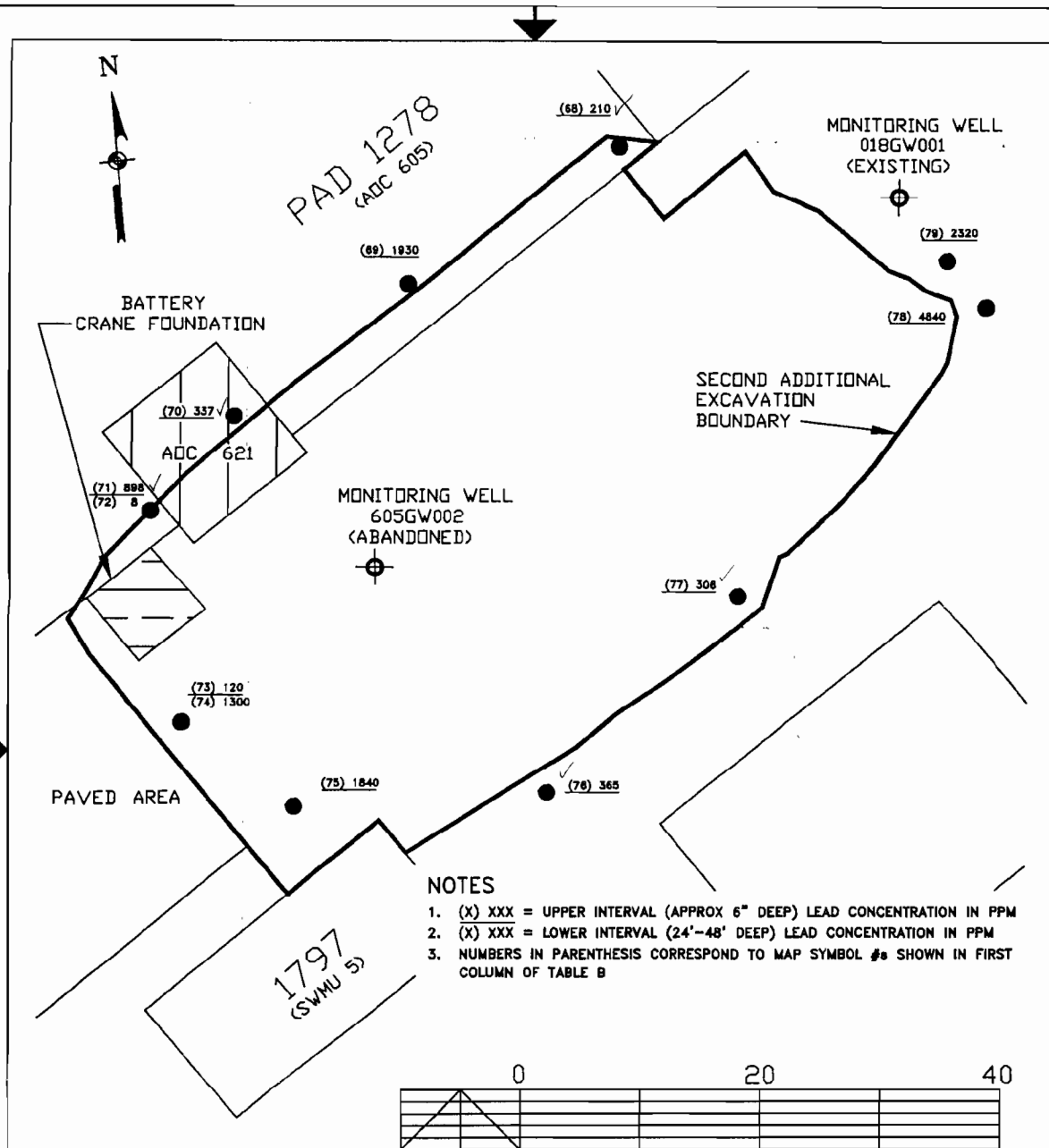


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1899 NORTH HOBSON AVENUE-BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

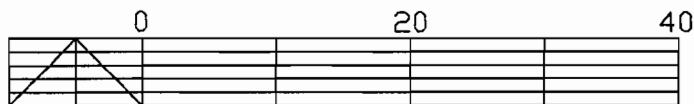
DRAWING TITLE			
FIGURE 6			
SWMU 5 COMPLETION REPORT			
SITE MAP WITH 1st ADDITIONAL EXCAVATION BOUNDARY AND 2nd ROUND SAMPLE LOCATIONS			
SIZE	DATE	PREPARED BY	REV
A	03-25-98	D. R. MORSE	-
SCALE	-	SHEET	B-6

sampling done in 1997



NOTES

1. (X) XXX = UPPER INTERVAL (APPROX 6" DEEP) LEAD CONCENTRATION IN PPM
2. (X) XXX = LOWER INTERVAL (24"-48" DEEP) LEAD CONCENTRATION IN PPM
3. NUMBERS IN PARENTHESIS CORRESPOND TO MAP SYMBOL #s SHOWN IN FIRST COLUMN OF TABLE B



GRAPHIC SCALE (FEET)



ENVIRONMENTAL DETACHMENT CHARLESTON

1899 NORTH HOBSON AVENUE-BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

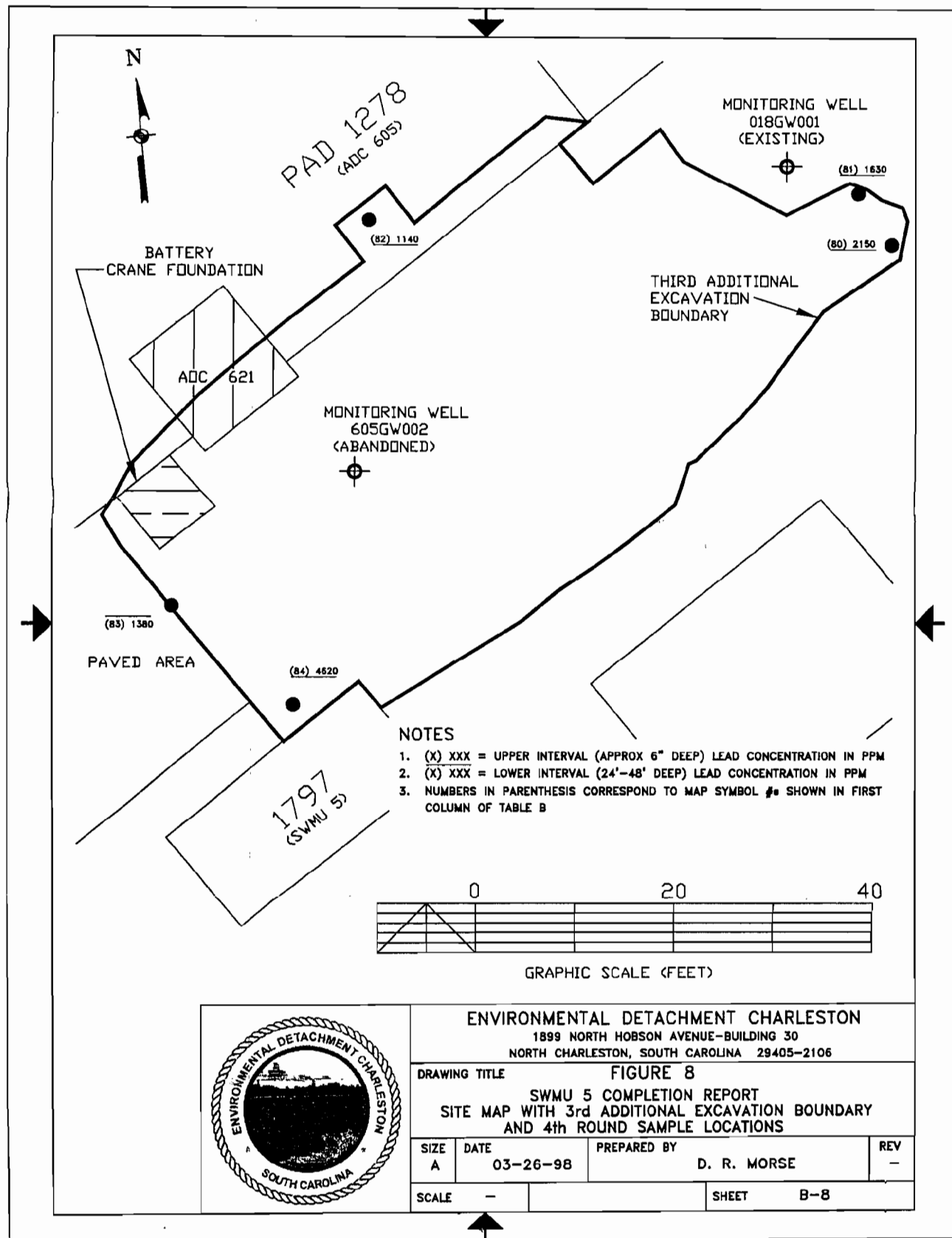
DRAWING TITLE

FIGURE 7

SWMU 5 COMPLETION REPORT
SITE MAP WITH 2nd ADDITIONAL EXCAVATION BOUNDARY
AND 3rd ROUND SAMPLE LOCATIONS

SIZE	DATE	PREPARED BY	REV
A	03-25-98	D. R. MORSE	-
SCALE	-	SHEET	B-7

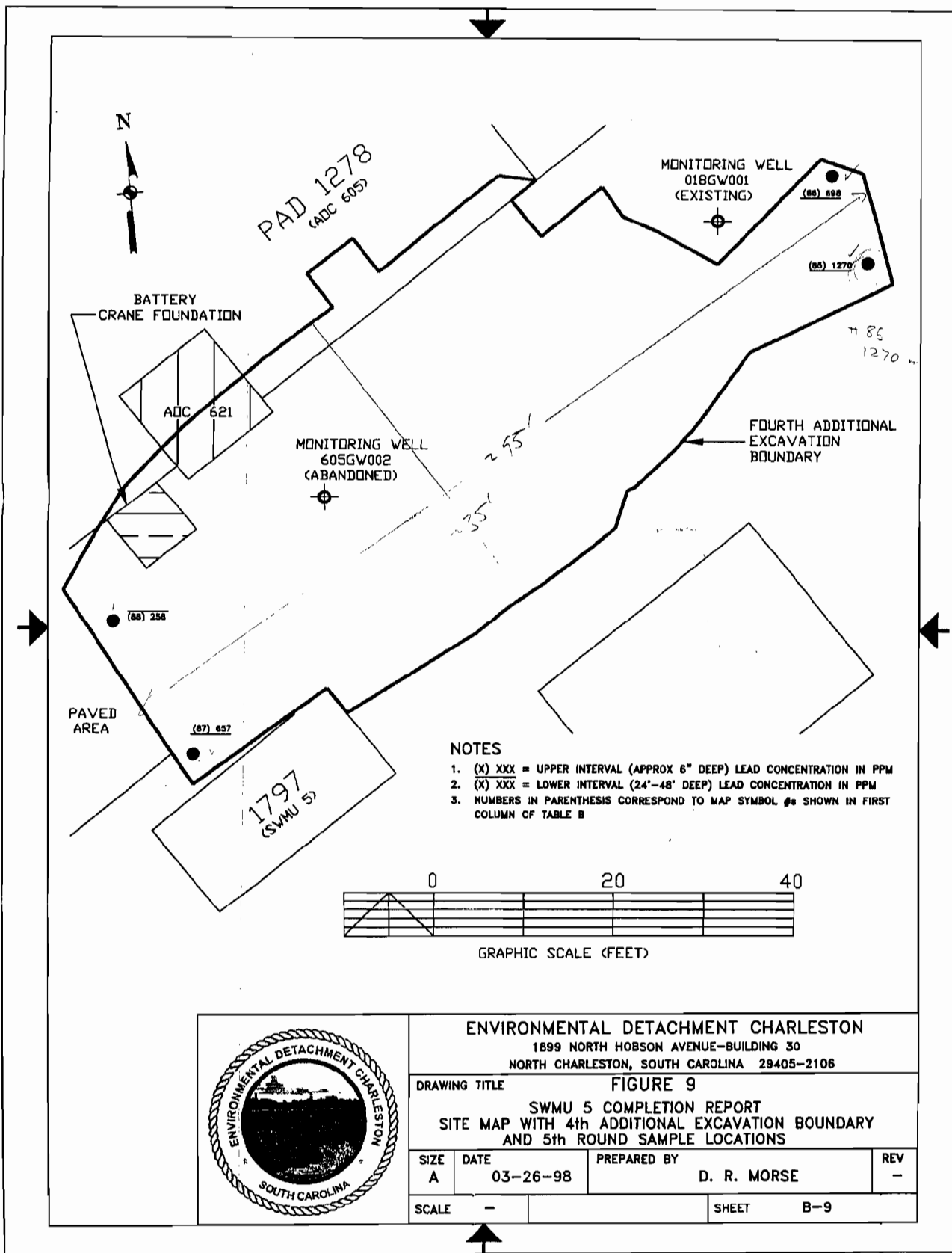
Sampling done in 1977

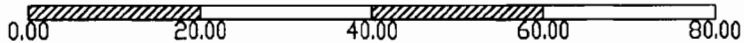
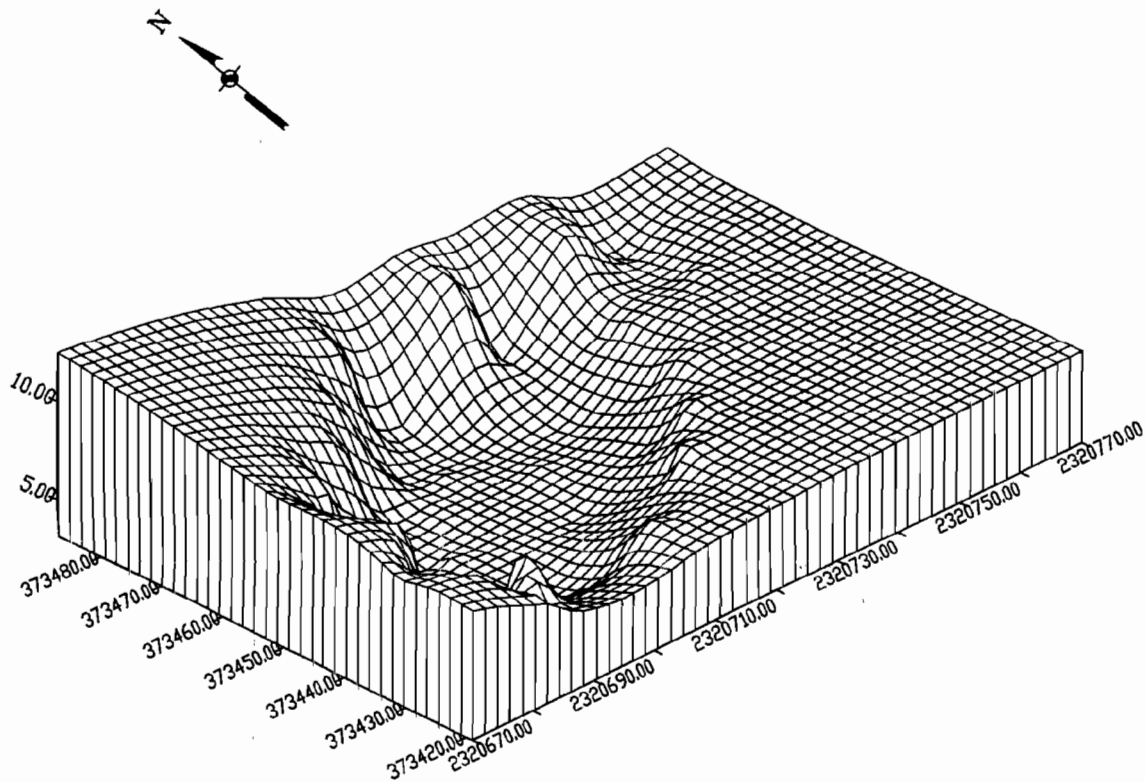


surface INDRBC = 1000

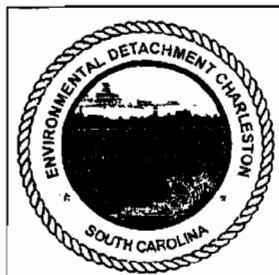
sampling done in 197

LO. SURF. SSL = 400





GRAPHIC SCALE (FEET)



ENVIRONMENTAL DETACHMENT CHARLESTON

1899 NORTH HOBSON AVENUE-BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

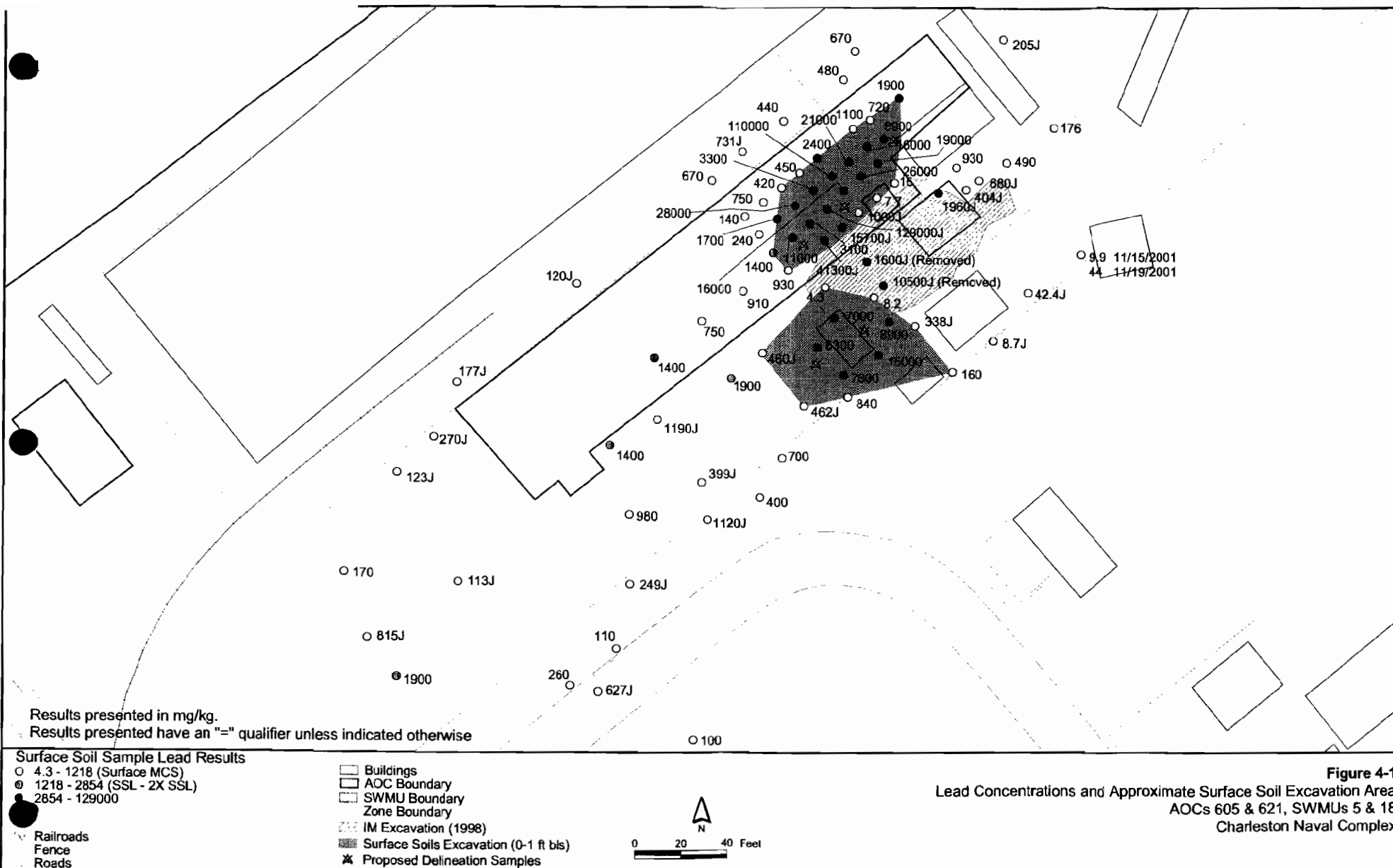
DRAWING TITLE

FIGURE 10

SWMU 5 COMPLETION REPORT
3-D TOPOGRAPHIC SITE MAP OF FINAL EXCAVATION

SIZE A	DATE 03-30-98	PREPARED BY D. R. MORSE	REV -
SCALE -		SHEET B-10	

Appendix B



StationID	E0052A001		E0052A001		E005SA001		E005SA002		
SampleID	0052A001M1		0052A001M1		005SA001M2		005SA002M2		
DateCollected	08/19/2002		08/19/2002		09/05/2002		09/05/2002		
DateExtracted	08/21/2002		08/21/2002		09/10/2002		09/10/2002		
DateAnalyzed	08/25/2002		08/26/2002		09/11/2002		09/11/2002		
SDGNumber	65645		65645		CNC143		CNC143		
Parameter	Units								
Arsenic, TCLP	mg/L	0.04	U			0.053	U	0.053	U
Barium, TCLP	mg/l	0.16	U			0.32	J	0.36	J
Cadmium, TCLP	mg/L	0.004	U			0.0071	U	0.017	J
Chromium, TCLP	mg/l	0.005	U			0.017	U	0.017	U
Lead	mg/kg								
Lead, TCLP	mg/L	0.12	J			350	=	85	=
Selenium, TCLP	mg/l	0.027	U			0.042	U	0.042	U
Silver, TCLP	mg/l	0.012	U			0.019	U	0.019	U
Mercury, TCLP	mg/L			0.001	U				

Analytical Data Summary

04/18/2003 3:29 PM

StationID		E005SB060		E005SB061		E005SB062		E005SB063	
SampleID		005SB06003 (3-5ft)		005SB06103 (3-5ft)		005SB06203 (3-5ft)		005SB06303 (3-5ft)	
DateCollected		09/05/2002		09/05/2002		09/05/2002		09/05/2002	
DateExtracted		09/09/2002		09/09/2002		09/09/2002		09/09/2002	
DateAnalyzed		09/10/2002		09/10/2002		09/10/2002		09/10/2002	
SDGNumber		CNC143		CNC143		CNC143		CNC143	
Parameter	Units								
Arsenic, TCLP	mg/L								
Barium, TCLP	mg/l								
Cadmium, TCLP	mg/L								
Chromium, TCLP	mg/l								
Lead	mg/kg	540	=	820	=	1100	=	930	=
Lead, TCLP	mg/L								
Selenium, TCLP	mg/l								
Silver, TCLP	mg/l								
Mercury, TCLP	mg/L								

Analytical . Summary

04/18/2006 1:29 PM

StationID		E005SB064		E005SB064		E005SB065		E005SB066	
SampleID		005CB06403 (3-5ft)		005SB06403 (3-5ft)		005SB06503 (6-6ft)		005SB06603	
DateCollected		09/05/2002		09/05/2002		10/16/2002		10/16/2002	
DateExtracted		09/10/2002		09/10/2002		10/17/2002		10/18/2002	
DateAnalyzed		09/11/2002		09/11/2002		10/19/2002		10/22/2002	
SDGNumber		CNC143		CNC143		68916		68920	
Parameter	Units								
Arsenic, TCLP	mg/L								
Barium, TCLP	mg/l								
Cadmium, TCLP	mg/L								
Chromium, TCLP	mg/l								
Lead	mg/kg	4400	=	4600	=	245	=		
Lead, TCLP	mg/L							202	=
Selenium, TCLP	mg/l								
Silver, TCLP	mg/l								
Mercury, TCLP	mg/L								

Analytical Data Summary

04/18/2003 3:29 PM

	StationID	E005SB067		E005SB069		E005SB070		E005SB071	
	SampleID	005SB06703		005SB06903 (2-2ft)		005SB07003 (2-2ft)		005SB071N1 (6-6ft)	
	DateCollected	10/16/2002		10/16/2002		10/16/2002		01/09/2003	
	DateExtracted	10/18/2002		10/17/2002		10/17/2002		01/10/2003	
	DateAnalyzed	10/22/2002		10/19/2002		10/19/2002		01/14/2003	
	SDGNumber	68920		68916		68916		73132	
Parameter	Units								
Arsenic, TCLP	mg/L								
Barium, TCLP	mg/l								
Cadmium, TCLP	mg/L								
Chromium, TCLP	mg/l								
Lead	mg/kg			570	=	329	=	19.9	=
Lead, TCLP	mg/L	60.7	=						
Selenium, TCLP	mg/l								
Silver, TCLP	mg/l								
Mercury, TCLP	mg/L								

Analytical . Summary

04/18/2006 12:29 PM

StationID		E605GW004		E605GW005		E605GW04R		E605GW05R		E605GW05R	
SampleID		605GW004M1		605GW005M1		605GW04RN1		605GW05RN1		605HW05RN1	
DateCollected		09/05/2002		09/05/2002		02/28/2003		02/28/2003		02/28/2003	
DateExtracted		09/10/2002		09/10/2002		03/03/2003		03/03/2003		03/03/2003	
DateAnalyzed		09/11/2002		09/11/2002		03/07/2003		03/07/2003		03/10/2003	
SDGNumber		CNC143		CNC143		75735		75735		75735	
Parameter	Units										
Lead	mg/l	0.015	=	0.007	=						
Lead	ug/L					3.7	=	2.67	U	13.4	U

Analytical Data Summary

04/18/2003 3:29 PM

StationID		E605GW06R	
SampleID		605GW06RN1	
DateCollected		02/28/2003	
DateExtracted		03/03/2003	
DateAnalyzed		03/07/2003	
SDGNumber		75735	
Parameter	Units		
Lead	mg/l		
Lead	ug/L	2.88	J

Analytical . Summary

04/18/2006 1:09 PM

	StationID	E605GW04R		E605GW05R		E605GW05R		E605GW06R	
	SampleID	605GW04RN1		605GW05RN1		605HW05RN1		605GW06RN1	
	DateCollected	02/28/2003		02/28/2003		02/28/2003		02/28/2003	
	DateExtracted	03/03/2003		03/03/2003		03/03/2003		03/03/2003	
	DateAnalyzed	03/07/2003		03/07/2003		03/10/2003		03/07/2003	
	SDGNumber	75736		75736		75736		75736	
Parameter	Units								
Lead, Dissolved	ug/L	2.67	U	2.67	U	13.4	U	7.21	=

Data Validation Summary - Charleston Naval Complex – Zone E, SWMU 5

TO: Jim Edens/CH2M HILL/GNA

FROM: Amy Juchem/CH2M HILL/GNA
Herb Kelly/CH2M HILL/GNA

DATE: March 28, 2003

The purpose of this memorandum is to present the results of the data validation process for the groundwater samples collected at Zone E, SWMU 5. The samples were collected between the dates of August 19, 2002 and February 28, 2003.

The specific samples and analytical fractions reviewed are summarized below in **Table 1**.

The Quality Control areas that were reviewed and the resulting findings are documented within each subsection that follows. This data was validated for compliance with the analytical method requirements. This process also included a review of the data to assess the accuracy, precision, and completeness based upon procedures described in the guidance documents such as the Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2002) and *National Functional Guidelines for Organic Data Review* (EPA 1999). Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: Metals (total and dissolved) following SW-846 6010/7000 Series methodology. Additionally, Toxicity Characteristic Leaching Procedure (TCLP) was performed followed by analysis of Metals following SW-846 6010/7000 Series methodology.

Samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia, for the following analyses: Metals following SW-846 6010/7000 Series methodology.

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

Attachment 1 lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

- [=] Detected. The analyte was analyzed for and detected at the concentration shown.
- [J] Estimated. The analyte was present but the reported value may not be accurate or precise.
- [U] Undetected. The analyte was analyzed for but not detected above the method detection limit.
- [UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.
- [R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

<u>Code</u>	<u>Definition</u>
2S	Second Source
2C	Second Column Confirmation
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals - B's → J's)
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TD	Total vs Dissolved
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	Upper Depth	Lower Depth	Date Collected	Total Metals SW6010	TCLP Metals SW6010	Total Lead SW6010	Dissolved Lead SW6010	TCLP Lead SW6010	Mercury SW7470	TCLP Mercury SW7470
65645	E0052A001	0052A001M1	65645001	SO	N			08/19/02		X					X
65645	E0052A001	0052A001M1MS	1200286826	SO	MS			08/19/02		X					
65645	E0052A001	0052A001M1SD	1200286828	SO	SD			08/19/02		X					
65645	LABQC	1200286830	1200286830	SQ	LB					X					X
65645	LABQC	1200287488	1200287488	WQ	LB				X						
65645	LABQC	1200287491	1200287491	WQ	BS				X						
65645	LABQC	1200287559	1200287559	WQ	LB									X	
65645	E0052A001	0052A001M1MS	1200287560	SO	MS			08/19/02							X
65645	E0052A001	0052A001M1SD	1200287562	SO	SD			08/19/02							X
65645	LABQC	1200287564	1200287564	WQ	BS									X	
68915	LABQC	1200318016	1200318016	WQ	LB						X				
68915	LABQC	1200318017	1200318017	WQ	BS						X				
68915	FIELDQC	005EB065M3	68915001	WQ	EB			10/16/02			X				
68916	E005SB070	005SB07003	68916001	SO	N	2	2	10/16/02			X				
68916	E005SB069	005SB06903	68916002	SO	N	2	2	10/16/02			X				
68916	E005SB065	005SB06503	68916003	SO	N	6	6	10/16/02			X				
68916	LABQC	1200318007	1200318007	SQ	LB						X				
68916	LABQC	1200318008	1200318008	SQ	BS						X				
68916	E005SB070	005SB07003MS	1200318009	SO	MS	2	2	10/16/02			X				
68916	E005SB070	005SB07003SD	1200318010	SO	SD	2	2	10/16/02			X				
68920	E005SB067	005SB06703	68920001	SO	N			10/16/02					X		
68920	E005SB066	005SB06603	68920002	SO	N			10/16/02					X		

SDG	Station ID	Sample ID	Ref Sample ID	Matrix	Sample Type	Upper Depth	Lower Depth	Field Collect #	Field Date	Lab Date	Lab Date	Lab Date	Lab Date	Lab Date	Lab Date
									SW/600	SW/600	SW/600	SW/600	SW/600	SW/600	SW/600
68920	E005SB067	005SB06703MS	1200317938	SO	MS			10/16/02						X	
68920	E005SB067	005SB06703SD	1200317939	SO	SD			10/16/02						X	
68920	LABQC	1200317940	1200317940	SQ	LB									X	
68920	LABQC	1200318532	1200318532	WQ	LB					X					
68920	LABQC	1200318534	1200318534	WQ	BS					X					
73132	E005SB071	005SB071N1	73132001	SO	N			01/09/03			X				
73132	LABQC	1200362487	1200362487	SQ	LB					X					
73132	LABQC	1200362488	1200362488	SQ	BS					X					
73132	E005SB071	005SB071N1MS	1200362489	SO	MS			01/09/03			X				
73132	E005SB071	005SB071N1SD	1200362490	SO	SD			01/09/03			X				
73136	FIELDQC	005EB071N1	73136001	WQ	EB			01/09/03			X				
73136	LABQC	1200362694	1200362694	WQ	LB					X					
73136	LABQC	1200362695	1200362695	WQ	BS					X					
75735	FIELDQC	605EW04RN1	75735001	WQ	EB			02/28/03			X				
75735	E605GW04R	605GW04RN1	75735003	WG	N			02/28/03			X				
75735	E605GW05R	605GW05RN1	75735004	WG	N			02/28/03			X				
75735	E605GW05R	605HW05RN1	75735005	WG	FD			02/28/03			X				
75735	E605GW06R	605GW06RN1	75735006	WG	N			02/28/03			X				
75735	LABQC	1200388629	1200388629	WQ	LB					X					
75735	LABQC	1200388630	1200388630	WQ	BS					X					
75735	E605GW04R	605GW04RN1MS	1200388631	WG	MS			02/28/03			X				
75735	E605GW04R	605GW04RN1SD	1200388632	WG	SD			02/28/03			X				
75736	FIELDQC	605EW04RN1	75736001	WQ	EB			02/28/03				X			

SDG	Station ID	Sample ID	Lab Sample ID	Media	Sample Type	Depth (ft)	Time	Date	Field Notes	SCB Metal SW6010	Soil Lead SW6010	Distal Lead SW6010	Distal Cad SW6010	Mercury SW7470	PCB Metals SW-270
75736	E605GW04R	605GW04RN1	75736002	WG	N			02/28/03				X			
75736	E605GW05R	605GW05RN1	75736003	WG	N			02/28/03				X			
75736	E605GW05R	605HW05RN1	75736004	WG	FD			02/28/03				X			
75736	E605GW06R	605GW06RN1	75736005	WG	N			02/28/03				X			
75736	LABQC	1200388629	1200388629	WQ	LB						X				
75736	LABQC	1200388630	1200388630	WQ	BS						X				
CNC143	E005SB060	005SB06003	S246345*1	SO	N			09/05/02			X				
CNC143	E005SB061	005SB06103	S246345*2	SO	N	3	5	09/05/02			X				
CNC143	E005SB062	005SB06203	S246345*3	SO	N	3	5	09/05/02			X				
CNC143	E005SB063	005SB06303	S246345*4	SO	N	3	5	09/05/02			X				
CNC143	E005SB064	005SB06403	S246345*5	SO	N	3	5	09/05/02			X				
CNC143	E005SB064	005CB06403	S246345*6	SO	FD	3	5	09/05/02			X				
CNC143	FIELDQC	005EB060M2	S246345*7	WQ	EB			09/05/02			X				
CNC143	E605GW004	605GW004M1	S246345*8	WG	N			09/05/02			X				
CNC143	E605GW005	605GW005M1	S246345*9	WG	N			09/05/02			X				
CNC143	FIELDQC	605EW004M1	S246345*10	WQ	EB			09/05/02			X				
CNC143	E005SA001	005SA001M2	S246345*11	SO	N			09/05/02		X					
CNC143	E005SA002	005SA002M2	S246345*12	SO	N			09/05/02		X					
CNC143	LABQC	4634513LB	S246345*13	SQ	LB				X						
CNC143	LABQC	4634514BS	S246345*14	SQ	BS				X						
CNC143	LABQC	4634520LB	S246345*20	WQ	LB				X						
CNC143	LABQC	4634521BS	S246345*21	WQ	BS				X						
CNC143	LABQC	4634527LB	S246345*27	WQ	LB					X					

SDG	STATION ID	SAMPLE ID	LAB SAMP ID	Matrix	Sample Type	Depth	Equip	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
CNC143	LABQC	4634528BS	S246345*28	WQ	BS						X				

MATRIX CODE
WG – Groundwater
WQ – Water QC Sample
SO – Soil
SQ – Soil QC Sample

SAMPLE TYPE CODE
BS - Blank Spike
EB - Equipment Blank
FD - Field Duplicate
N - Native Sample
LB - Laboratory Blank
MS – Matrix Spike
SD – Matrix Spike Duplicate

ANALYSIS CODE
TCLP – Toxicity Characteristic Leaching Procedure

Inorganic Parameters

Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for inorganic parameters.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Sample preparation, initial calibration blanks/continuing calibration blanks, and equipment blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", in which target parameters have been added prior to digestion/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Pre/Post Digestion Spike (MS/MSD)** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **ICP Interference Check Sample** – This sample verifies the lab's interelement and background correction factors.
- **Initial Calibration Verification** – This parameter ensures that the instrument is capable of producing acceptable quantitative data for the target analyte list to be measured.
- **Continuing Calibration Verification** – This one-point, mid-range parameter establishes that the initial calibration is still valid by checking the performance of the instrument on a continual basis.
- **ICP Serial Dilution** – The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to the sample matrix.

Metals Analyses

The QA/QC parameters for the Metals analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The Metals target parameters detected in blank samples are listed in [Table 2](#).

TABLE 2

Blank Contamination: Metals

Charleston Naval Complex, Zone E, SWMU 5, Charleston, SC

Sample ID	Sample Name	Sample ID	Sample Name	Parameter	Conc.	Unit	Target
CNC143	CCB		CCB	Selenium	5.80	ug/L	0.029 mg/L
CNC143	S246345*20	4634520LB	LB	Lead	0.00102	mg/L	0.0051 mg/L
CNC143	S246345*13	4634513LB	LB	Lead	0.502	mg/Kg	2.51 mg/Kg
CNC143	S246345*7	005EB060M2	EB	Lead	0.00078	mg/L	0.0039 mg/L or 0.39 mg/Kg
65645	CCB		CCB	Barium	0.372	ug/L	0.00186 mg/L
65645	CCB		CCB	Cadmium	0.559	ug/L	0.002795 mg/L
65645	CCB		CCB	Chromium	1.07	ug/L	0.00535 mg/L
65645	CCB		CCB	Mercury	0.0510	ug/L	0.000255 mg/L
65645	1200286830	1200286830	LB	Barium, TCLP	0.046	mg/L	0.23 mg/L
65645	1200286830	1200286830	LB	Cadmium, TCLP	0.003	mg/L	0.015 mg/L
65645	1200286830	1200286830	LB	Chromium, TCLP	0.006	mg/L	0.03 mg/L
65645	1200286830	1200286830	LB	Mercury, TCLP	0.001	mg/L	0.005 mg/L
68920	CCB		CCB	Lead	4.71	ug/L	0.02355 mg/L
73132	CCB		CCB	Lead	1.93	ug/L	0.4825 mg/Kg
73132	1200362487	1200362487	LB	Lead	0.189	mg/Kg	0.945 mg/Kg
73132	73136001	005EB071N1	EB	Lead	2.63	ug/L	0.6575 mg/Kg
73136	CCB		CCB	Lead	2.72	ug/L	13.6 ug/L

If a target parameter was reported in a field sample, and the concentration was below the level determined to be due to blank contamination (5 times the concentration in the associated QC blank samples), it was flagged as "U", not detected. Initial and continuing calibration blanks were also evaluated for possible contamination.

The results qualified due to blank contamination are listed in [Attachment 1](#).

Rejected Data

No data were rejected based upon the validation process for this sampling event.

Conclusion

A review of the analytical data submitted regarding the investigation of SWMU 5 in Zone E at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

The analytical data had minor QC concerns as indicated above, however, it did not affect data usability for those specific results. The validation review demonstrated that the analytical systems were generally in control and the data results can be used in the decision making process.

Attachment 1 - Change Qualifiers and Results
Zone E, SWMU 5 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
METAL	SW6010B	BARIUM, TCLP	65645	0052A001M1	65645001	SO	0.16	B	0.16	U	mg/L	BL
METAL	SW6010B	BARIUM, TCLP	CNC143	005SA001M2	S246345*11	SO	0.32	B	0.32	J	mg/l	IB
METAL	SW6010B	BARIUM, TCLP	CNC143	005SA002M2	S246345*12	SO	0.36	B	0.36	J	mg/l	IB
METAL	SW6010B	CADMIUM, TCLP	65645	0052A001M1	65645001	SO	0.004	B	0.004	U	mg/L	BL
METAL	SW6010B	CADMIUM, TCLP	CNC143	005SA002M2	S246345*12	SO	0.017	B	0.017	J	mg/l	IB
METAL	SW6010B	LEAD	75735	605GW06RN1	75735006	WG	2.88	B	2.88	J	ug/L	IB
METAL	SW6010B	LEAD, TCLP	65645	0052A001M1	65645001	SO	0.12	B	0.12	J	mg/L	IB
METAL	SW7470A	MERCURY, TCLP	65645	0052A001M1	65645001	SO	0.001	B	0.001	U	mg/L	BL

RCRA
Samples complete
Composite of Battery
Tracking Slab,
asphalt &
concrete
waste
Characterize

8.19/1140

Relinquished by: _____ Date/Time: _____

Shipped Via: ☐ UPS ☐ FedEx ☐ Hand ☐ Other ☐ Tracking#

Temperature: 15

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZE605-082602-01 page 1 of 2

Laboratory: <u>GEL - STL</u>		Project Name: <u>Charleston Navy Complex</u>		Site Name: <u>Zone E, AOC 605</u>		Lab Batch/SDG:		
Project Number: <u>158814.PM.04</u>		TAT: <u>1-QTAT-7</u>						
Project Manager: <u>Tom Beisel</u>		QA Level: <u>level 3</u>						
Address: <u>GNV: 3011 SW Williston Rd., Gainesville, FL 32605</u>								
ATL: <u>115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278</u>								
Send Report To: <u>see last page of COC</u>		EDD: <u>CNC format</u>						
Sample ID	Station ID	Sample Description	Depth Begin End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B)	Comments
605GW004M1	E605GW004			9/3 1230	WG	1	X	
605HW004M1	E605GW004				WG		X	changed to 006
605GW005M1	E605GW005			9/4 0800	WG	1	X	
605EW004M1	E605EW004			9/3 1315	WQ	1	X	EB
605GN006M1	E605GW006			9/3 1306	WQ	1	X	Samples collected but, Not sent to the Lab. - Per J. COORS
605HW006M1	E605GW006			9/3 1310	WQ	1	X	

PUSH!

Sampled By: BCDate/Time: Sept 4 2002 1600Relinquished by: BMDate/Time: Sept 5/200

Additional Samplers:

Sept 5 20

Received By Lab:

Date/Time:

Relinquished by:

Date/Time:

W

R/ Exceptions:

S246345

L

Page 1 of 2

PUSH!

S246345

Laboratory: GEL		Project Name: Charleston Navy Complex		Site Name: Zone E, SWMU 5/18		Lab Batch/SDG:	
Project Number: 158814.PM.04		TAT: 1-QTAT-7		QA Level: level 3			
Project Manager: Tom Beisel		Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605		ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278			
Send Report To: see last page of COC		EDD: CNC format					
Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	Comments
			Begin	End			
005SB06503	E005SB065	Grab	6'	6'	10-16-02 0850	SO	1
005SB06603	E005SB066	TCLP	-	-	10-16-02 1000	SO	1
005CB06603	E005SB066					SO	X
005SB06703	E005SB067	TCLP			10-16-02 1215	SO	X
005SB06803	E005SB068	Grab North	1	2	10-16-02	SO	X
005SB06903	E005SB069	Grab South	2	2	10-16-02 1225	SO	1
005SB07003	E005SB070	Grab North	2	2	10-16-02 1220	SO	1
005SB07003MS	E005SB070	Grab North	2	2	10-16-02 1220	SO	1
005SB07003SD	E005SB070	Grab North	2	2	10-16-02 1220	SO	1
005EB065M3	E005EB065	Equip. Blank			10-16-02 1200	SQ	1

Sampled By: BCRAWFORD Date/Time: 10-16-02 1600 Relinquished by: _____ Date/Time: _____
 Additional Samplers: _____
 Received By Lab: J. Stanley Date/Time: 10/17/02 16:00 Relinquished by: _____ Date/Time: _____
 Received By: _____ Date/Time: _____ Shipped Via: UPS FedEx Hand Other Tracking#: _____
 Remarks: _____ Temperature: _____
 Receipt Exceptions: _____

COC Tracking #: ZE005-010703-01

[illegible]

Appendix E



PROJECT NUMBER
158814

WELL NUMBER
605GW04R

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : SWMU 5 ZONE E Charleston Naval Complex

LOCATION : Charleston, South Carolina

DRILLING CONTRACTOR : Prosonic Corporation License # 14: (Richard Mooney-Driller)

NORTHING : 373443.8491

DRILLING METHOD AND EQUIPMENT USED : Geoprobe /4.25-inch hollow stem augers

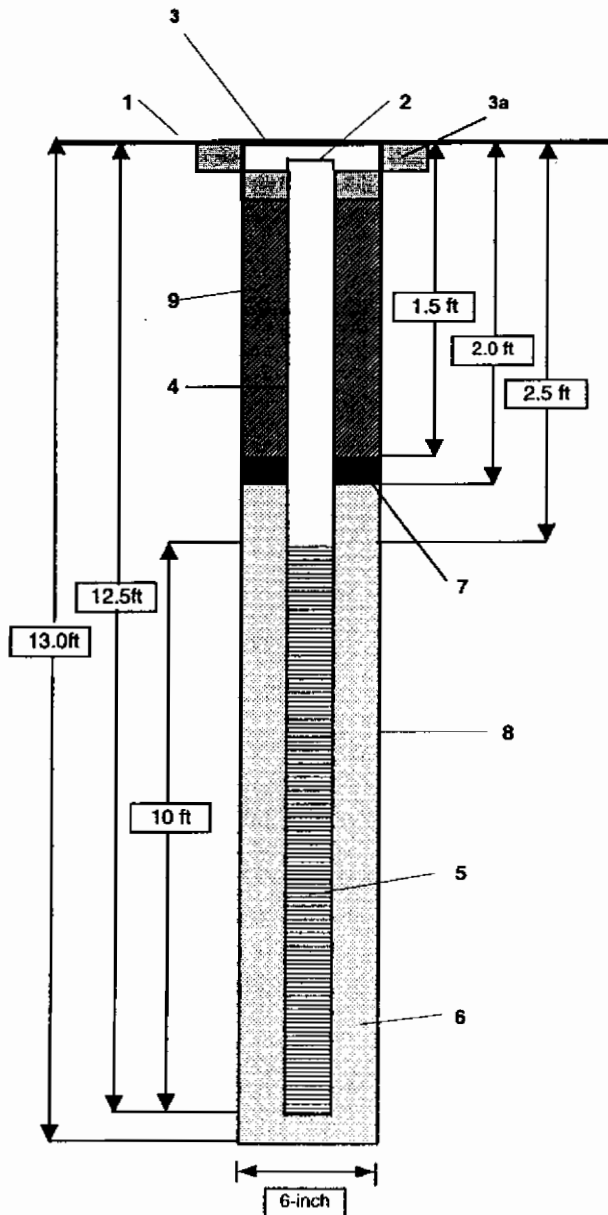
EASTING : 2320696.229

WATER LEVELS :

START : 02-17-03

END: 02-18-03

LOGGER : Andrew O'Connor



1- Ground elevation at well	8.45
2- Top of casing elevation	8.326
3- Protective cover type	8-ich dia. flush mount manhole vault
a) concrete pad dimensions	2 ft x 2 ft x 6-inches deep
4- Dia./type of well casing	2-inch inside diameter schedule 40 PVC
5- Type/slot size of screen	0.010-inch dia. machine slotted PVC
6- Type filter pack	20/30 Sieve Size Silica Sand
7- Type of seal	3/8-inch bentonite chips
8- Borehole diameter	6-inch
9- Grout	Portland Type II

Note: Diagram not to scale.



PROJECT NUMBER 158814	BORING NUMBER 605GW04R
SOIL BORING LOG	

PROJECT : Charleston Naval Complex - ZONE E, SWMU 5 LOCATION : Charleston, SC NORTHING : 373443.8491
 ELEVATION : DRILLING CONTRACTOR : Prosonic Corporation License # 1435 EASTING : 2320896.229
 DRILLING METHOD AND EQUIPMENT USED : 4.25-inch hollow stem auger (Geoprobe)
 WATER LEVELS : Not Measured START : 02/17/2003 END : 02/18/2003 LOGGER : Andrew O'Connor

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD	SOIL DESCRIPTION	COMMENTS
	RECOVERY (IN)	#/TYPE	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			TEST		
			RESULTS		
6"-6"-6"-6" (N)					
1	0-5.5'		Used rotasonic drilling method no penetration test	Back Fill ((SM) silty sands medium grain, brownish/tan	
2					
3					
4					
5					
6	5.5-7'			sand (SM) grey medium sands.	
7	7-9'			Clayey sands (SC) tan grey medium sand, plastic, and saturated at 9'	
8					
9	9-13'			organic Clays (OH), olive/grey and high plasticity, saturated.	
10					
11					
12					
13				Boring terminated at 13 ft	
14					
15					



PROJECT NUMBER

158814

WELL NUMBER

605GW05R

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : SWMU 5 ZONE E Charleston Naval Complex

LOCATION : Charleston, South Carolina

DRILLING CONTRACTOR : Prosonic Corporation License # 145 (Richard Mooney-Driller)

NORTHING 373417.3158

DRILLING METHOD AND EQUIPMENT USED : Geoprobe /4.25-inch hollow stem augers

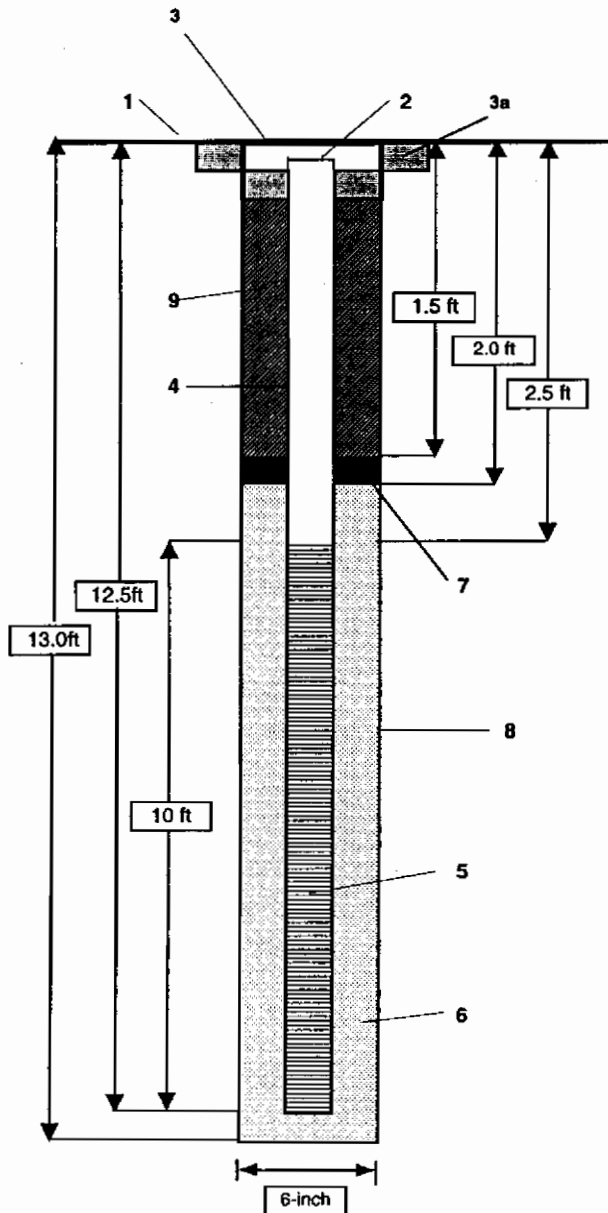
EASTING: 2320662.106

WATER LEVELS :

START : 02-17-03

END: 02-18-03

LOGGER : Andrew O'Connor



1- Ground elevation at well	8.63
2- Top of casing elevation	8.5064
3- Protective cover type	8-inch dia. flush mount manhole vault
a) concrete pad dimensions	2 ft x 2 ft x 6-inches deep
4- Dia./type of well casing	2-inch inside diameter schedule 40 PVC
5- Type/slot size of screen	0.010-inch dia. machine slotted PVC
6- Type filter pack	20/30 Sieve Size Silica Sand
7- Type of seal	3/8-inch bentonite chips
8- Borehole diameter	6-inch
9- Grout	Portland Type II

Note: Diagram not to scale.



PROJECT NUMBER 158814	BORING NUMBER 605GW05R
SOIL BORING LOG	

PROJECT : Charleston Naval Complex - ZONE E, SWMU 5 LOCATION : Charleston, SC NORTHING: 373417.3158
 ELEVATION : DRILLING CONTRACTOR : Prosonic Corporation License # 1435 EASTING: 2320662.106
 DRILLING METHOD AND EQUIPMENT USED : 4.25-inch hollow stem auger (Geoprobe)
 WATER LEVELS : Not Measured START : 02/17/2003 END: 02/18/2003 LOGGER : Andrew O'Connor

DEPTH BELOW SURFACE (FT)		INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		COMMENTS	
		RECOVERY (IN)		6"-6"-6"-6" (N)					
		#/TYPE							
1	0-2'			Used rotasonic drilling method no penetration test		ROC and small wood fragments (GP) Poorly graded gravels, gravel sands and wood fragments.			
2						Clayey gravels (GC) orange-brown, fine to medium grain saturated and loose.			
3	2-5'								
4									
5	5-6'					(SC) Brownish/Grey medium clayey sands.			
6									
7	6-13'					Clayey sand (SC) some fine sand, saturated, high plasticity, greenish gray and light olive gray			
8									
9									
10									
11									
12									
13						Boring terminated at 13 ft			
14									
15									



CH2MHILL

PROJECT NUMBER

158814

WELL NUMBER

605GW06R

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : SWMU 5 ZONE E Charleston Naval Complex

LOCATION : Charleston, South Carolina

DRILLING CONTRACTOR : Prosonic Corporation License # 142 (Richard Mooney-Driller)

NORTHING 373475.43

DRILLING METHOD AND EQUIPMENT USED : Geoprobe /4.25-inch hollow stem augers

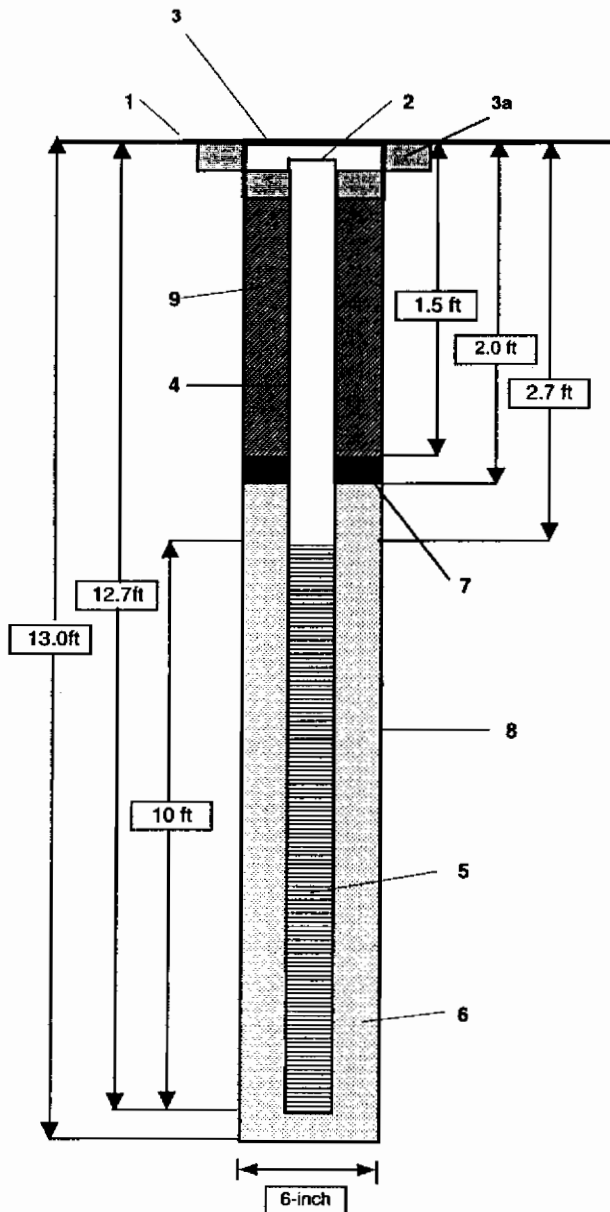
EASTING: 2320689.57

WATER LEVELS :

START : 02-17-03

END: 02-18-03

LOGGER : Andrew O'Connor



1- Ground elevation at well	8.36
2- Top of casing elevation	8.2308
3- Protective cover type	8-inch dia. flush mount manhole vault
a) concrete pad dimensions	2 ft x 2 ft x 6-inches deep
4- Dia./type of well casing	2-inch inside diameter schedule 40 PVC
5- Type/slot size of screen	0.010-inch dia. machine slotted PVC
6- Type filter pack	20/30 Sieve Size Silica Sand
7- Type of seal	3/8-inch bentonite chips
8- Borehole diameter	6-inch
9- Grout	Portland Type II

Note: Diagram not to scale.



PROJECT NUMBER 158814	BORING NUMBER 605GW06R
SOIL BORING LOG	

PROJECT: Charleston Naval Complex - ZONE E, SWMU 5 LOCATION: Charleston, SC NORTHING: 373475.43
 ELEVATION: DRILLING CONTRACTOR: Prosonic Corporation License # 1435 EASTING: 2320689.57
 DRILLING METHOD AND EQUIPMENT USED: 4.25-inch hollow stem auger (Geoprobe)
 WATER LEVELS: Not Measured START: 02/17/2003 END: 02/18/2003 LOGGER: Andrew O'Connor

DEPTH BELOW SURFACE (FT)		STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION	COMMENTS
INTERVAL (FT)	RECOVERY (IN)	#/TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
		6"-6"-6"-6" (N)			
1-0-5.5'			Used rotasonic drilling method no penetration test	Back Fill ((SM) silty sands medium grain, brownish/tan	
2-					
3-					
4-					
5-					
6-5.5-9'					
7-7-9'				Clayey sands (SC) tan gray medium sand, plastic, and saturated at 9'	
8-					
9-9-13'				organic Clays (OH), olive/gray and high plasticity, saturated. "like pluff mud"	
10-					
11-					
12-					
13-				Boring terminated at 13 ft	
14-					
15-					

Site: SWMU 5
Media: Soil
Units: Metals, mg/Kg; Pesticides and SVOCs ug/Kg

Chemical	Exposure Area	Number of Samples	Number of Detects	Number of Nondetects	Frequency of Detection	Minimum Detect	Maximum Detect	Mean of Detects	Mean	Minimum Nondetect	Maximum Nondetect	W-Test	t-Statistic	UCL95 (normal)	UCL95 H-statistic (lognormal)	UCL95 (nonparametric)	UCL95 (bootstrap)
<i>Surface Soil</i>																	
Antimony	Central EA	8	8	0	100%	1.1	23.4	6.09	6.09	0	0	LOGNORMAL	1.90	11.1	3.07	19.5	1.1
Antimony	NE EA	15	14	1	93%	0.86	26	3.29	3.08	0.24	0.24	NONPARAMETRIC	1.76	6.01	2.744	5.33	0.88
Antimony	SW EA	5	5	0	100%	1.5	18.8	9.88	9.88	0	0	NORMAL	2.13	18.1	4.478	107	0
Arsenic	Central EA	6	6	0	100%	1.1	8.8	3.98	3.98	0	0	LOGNORMAL	1.90	5.88	2.858	8.69	1.1
Arsenic	NE EA	15	15	0	100%	0.95	7.8	3.09	3.09	0	0	NONPARAMETRIC	1.76	4.18	2.443	5.68	0.95
Arsenic	SW EA	5	5	0	100%	4	18.8	13.06	13.06	0	0	NORMAL	2.13	18.6	3.287	39.21	0
Copper	Central EA	8	8	0	100%	65	1900	421	421	0	0	LOGNORMAL	1.90	851	3.901	2659	65
Copper	Southwest	5	5	0	100%	37.5	624	222	222	0	0	LOGNORMAL	2.13	443	4.91	2996	0
Lead	Central EA	20	20	0	100%	2.4	1900	677	677	0	0	NORMAL	1.73	884	4.02	10866	177
Lead	NE EA	59	59	0	100%	2.4	2400	317	317	0	0	Unknown	1.68	431	3.97	4126	205
Lead	SW EA	11	11	0	100%	100	1900	423	423	0	0	LOGNORMAL	1.81	719	2.82	961	110
Dieldrin	NE EA	18	4	14	22%	0.55	6.98	3.5	1.836	1.3	1.6	NONPARAMETRIC	1.74	2.43	2.03	2.32	1.3
Dieldrin	SW EA	7	2	5	29%	0.55	5.01	2.78	1.844	1.3	1.65	LOGNORMAL	1.94	2.90	2.67	3.79	0
BEQs	SW EA	5	5	0	100%	370.11	6201	2080	2080	0	0	LOGNORMAL	2.13	4310	4.91	26532	0
BEQs	SWMU 5	28	25	3	89%	309.73	6201	981	915	214	439	NONPARAMETRIC	1.70	1268	2.06	1111	464
<i>Subsurface Soil</i>																	
Antimony	Central EA	7	7	0	100%	0.57	15.8	3.32	3.32	0	0						
Antimony	NE EA	11	10	1	91%	0.73	5.4	2.71	2.49	0.325	0.325						
Antimony	SW EA	2	2	0	100%	9.8	12.5	11.15	11.15	0	0						
Lead	Central EA	20	20	0	100%	1.3	2700	300	300	0	0						
Lead	NE EA	62	62	0	100%	2.4	5700	489	489	0	0						

Table F-1
COPC Concentrations used in Statistical Evaluation
SWMU 5, 18, AOC 605, and 621; Zone E
Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Antimony	E005SB003	005SB00301	C	2.9	J
Antimony	E605SB005	605SB00501	C	5.3	J
Antimony	E605SB006	605SB00601	C	2.7	J
Antimony	E605SB007	605SB00701	C	9.5	=
Antimony	E605SB008	605SB00801	C	2.1	J
Antimony	E605SB010	605SB01001	C	1.1	J
Antimony	E605SB011	605SB01101	C	1.7	J
Antimony	E605SB015	605SB01501	C	23.4	=
Antimony	E005SB001	005SB00101	NE	1.3	J
Antimony	E005SB002	005SB00201	NE	0.86	=
Antimony	E018SB001	018SB00101a	NE	3.7	J
Antimony	E018SB002	018SB00201a	NE	0.48	U
Antimony	E018SB003	018SB00301a	NE	1.6	J
Antimony	E018SB004	018SB00401a	NE	0.86	=
Antimony	E018SB005	018SB00501a	NE	26	=
Antimony	E605SB001	605SB00101	NE	1.7	J
Antimony	E605SB002	605SB00201	NE	0.86	=
Antimony	E605SB009	605SB00901	NE	4.5	J
Antimony	E605SB017	605SB01701	NE	1.2	J
Antimony	E621SB001	621SB00101	NE	0.86	=
Antimony	E621SB002	621SB00201	NE	0.86	=
Antimony	E621SB003	621SB00301	NE	0.86	=
Antimony	E621SB004	621SB00401	NE	0.86	=
Antimony	E605SB003	605SB00301	SW	6.5	J
Antimony	E605SB004	605SB00401	SW	1.5	J
Antimony	E605SB012	605SB01201	SW	18.6	=
Antimony	E605SB013	605SB01301	SW	9.5	=
Antimony	E605SB014	605SB01401	SW	13.3	=
Arsenic	E005SB003	005SB00301	C	5.2	=
Arsenic	E605SB005	605SB00501	C	7.2	=
Arsenic	E605SB006	605SB00601	C	2.5	=
Arsenic	E605SB007	605SB00701	C	3.2	=
Arsenic	E605SB008	605SB00801	C	8.8	=
Arsenic	E605SB010	605SB01001	C	2.3	=
Arsenic	E605SB011	605SB01101	C	1.5	=
Arsenic	E605SB015	605SB01501	C	1.1	J
Arsenic	E005SB001	005SB00101	NE	4.2	=
Arsenic	E005SB002	005SB00201	NE	0.95	J
Arsenic	E018SB001	018SB00101a	NE	3.5	=
Arsenic	E018SB002	018SB00201a	NE	3.2	=
Arsenic	E018SB003	018SB00301a	NE	6.8	=
Arsenic	E018SB004	018SB00401a	NE	0.95	J
Arsenic	E018SB005	018SB00501a	NE	7.8	=
Arsenic	E605SB001	605SB00101	NE	5.7	=
Arsenic	E605SB002	605SB00201	NE	0.95	J

Table F-1

COPC Concentrations used in Statistical Evaluation

SWMU 5, 18, AOC 605, and 621; Zone E

Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Arsenic	E605SB009	605SB00901	NE	3.3	=
Arsenic	E605SB017	605SB01701	NE	5.2	=
Arsenic	E621SB001	621SB00101	NE	0.95	J
Arsenic	E621SB002	621SB00201	NE	0.95	J
Arsenic	E621SB003	621SB00301	NE	0.95	J
Arsenic	E621SB004	621SB00401	NE	0.95	J
Arsenic	E605SB003	605SB00301	SW	10.9	=
Arsenic	E605SB004	605SB00401	SW	18.6	=
Arsenic	E605SB012	605SB01201	SW	14.9	=
Arsenic	E605SB013	605SB01301	SW	4.0	=
Arsenic	E605SB014	605SB01401	SW	16.9	=
Copper	E005SB003	005SB00301	C	91.0	=
Copper	E605SB005	605SB00501	C	291	=
Copper	E605SB006	605SB00601	C	82.1	=
Copper	E605SB007	605SB00701	C	746	=
Copper	E605SB008	605SB00801	C	65.0	=
Copper	E605SB010	605SB01001	C	65.7	=
Copper	E605SB011	605SB01101	C	131	=
Copper	E605SB015	605SB01501	C	1900	=
Copper	E605SB003	605SB00301	SW	165	=
Copper	E605SB004	605SB00401	SW	37.5	=
Copper	E605SB012	605SB01201	SW	624	=
Copper	E605SB013	605SB01301	SW	179	=
Copper	E605SB014	605SB01401	SW	106	=
Lead	E005SB003	005SB00301	C	462	J
Lead	E005SB011	005SB01101	C	910	=
Lead	E005SB016	005SB01601	C	840	=
Lead	E005SB021	005SB02101	C	750	=
Lead	E005SB022	005SB02201	C	1400	=
Lead	E005SB023	005SB02301	C	1400	=
Lead	E005SB024	005SB02401	C	1900	=
Lead	E005SB025	005SB02501	C	700	=
Lead	E005SB026	005SB02601	C	980	=
Lead	E005SB027	005SB02701	C	400	=
Lead	E005SB048	005SB04801	C	2.4	=
Lead	E005SB049	005SB04901	C	2.4	=
Lead	E005SB052	005SB05201	C	80	J
Lead	E605SB005	605SB00501	C	249	J
Lead	E605SB006	605SB00601	C	399	J
Lead	E605SB007	605SB00701	C	1190	J
Lead	E605SB008	605SB00801	C	460	J
Lead	E605SB010	605SB01001	C	120	J
Lead	E605SB011	605SB01101	C	177	J
Lead	E605SB015	605SB01501	C	1120	J
Lead	E005SB001	005SB00101	NE	338	J

Table F-1

COPC Concentrations used in Statistical Evaluation

SWMU 5, 18, AOC 605, and 621; Zone E

Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Lead	E005SB002	005SB00201	NE	2.4	=
Lead	E005SB004	005SB00401	NE	670	=
Lead	E005SB005	005SB00501	NE	480	=
Lead	E005SB006	005SB00601	NE	440	=
Lead	E005SB007	005SB00701	NE	670	=
Lead	E005SB008	005SB00801	NE	1900	=
Lead	E005SB009	005SB00901	NE	720	=
Lead	E005SB010	005SB01001	NE	2.4	=
Lead	E005SB012	005SB01201	NE	2.4	=
Lead	E005SB013	005SB01301	NE	4.3	=
Lead	E005SB014	005SB01401	NE	2.4	=
Lead	E005SB015	005SB01501	NE	160	=
Lead	E005SB032	005SB03201	NE	930	=
Lead	E005SB033	005SB03301	NE	490	=
Lead	E005SB034	005SB03401	NE	9.9	=
Lead	E005SB035	005SB03501	NE	44	=
Lead	E005SB050	005SB05001	NE	8.2	=
Lead	E005SB051	005SB05101	NE	2.4	=
Lead	E005SB053	005SB05301	NE	2.4	=
Lead	E005SB054	005SB05401	NE	2.4	=
Lead	E005SB055	005SB05501	NE	2.4	=
Lead	E005SB056	005SB05601	NE	2.4	=
Lead	E005SB059	005SB05901	NE	2.4	=
Lead	E018SB001	018SB00101a	NE	404	J
Lead	E018SB002	018SB00201a	NE	8.7	J
Lead	E018SB003	018SB00301a	NE	42.4	J
Lead	E018SB004	018SB00401a	NE	2.4	=
Lead	E018SB005	018SB00501a	NE	680	J
Lead	E605SB001	605SB00101	NE	205	J
Lead	E605SB002	605SB00201	NE	2.4	=
Lead	E605SB009	605SB00901	NE	731	J
Lead	E605SB017	605SB01701	NE	176	=
Lead	E621SB001	621SB00101	NE	2.4	=
Lead	E621SB002	621SB00201	NE	2.4	=
Lead	E621SB003	621SB00301	NE	2.4	=
Lead	E621SB004	621SB00401	NE	2.4	=
Lead	E621SB005	621SB00501	NE	2.4	=
Lead	E621SB006	621SB00601	NE	16	=
Lead	E621SB007	621SB00701	NE	2.4	=
Lead	E621SB008	621SB00801	NE	2.4	=
Lead	E621SB009	621SB00901	NE	2.4	=
Lead	E621SB010	621SB01001	NE	2.4	=
Lead	E621SB012	621SB01201	NE	1100	=
Lead	E621SB013	621SB01301	NE	2.4	=
Lead	E621SB014	621SB01401	NE	2.4	=

Table F-1
COPC Concentrations used in Statistical Evaluation
SWMU 5, 18, AOC 605, and 621; Zone E
Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Lead	E621SB015	621SB01501	NE	2.4	=
Lead	E621SB016	621SB01601	NE	450	=
Lead	E621SB017	621SB01701	NE	2400	=
Lead	E621SB018	621SB01801	NE	2.4	=
Lead	E621SB019	621SB01901	NE	2.4	=
Lead	E621SB020	621SB02001	NE	420	=
Lead	E621SB022	621SB02201	NE	930	=
Lead	E621SB023	621SB02301	NE	2.4	=
Lead	E621SB024	621SB02401	NE	1400	=
Lead	E621SB025	621SB02501	NE	1700	=
Lead	E621SB026	621SB02601	NE	240	=
Lead	E621SB027	621SB02701	NE	750	=
Lead	E621SB028	621SB02801	NE	140	=
Lead	E005SB017	005SB01701	SW	260	=
Lead	E005SB018	005SB01801	SW	100	=
Lead	E005SB019	005SB01901	SW	160	=
Lead	E005SB028	005SB02801	SW	110	=
Lead	E005SB029	005SB02901	SW	170	=
Lead	E005SB030	005SB03001	SW	1900	=
Lead	E605SB003	605SB00301	SW	270	J
Lead	E605SB004	605SB00401	SW	113	J
Lead	E605SB012	605SB01201	SW	815	J
Lead	E605SB013	605SB01301	SW	627	J
Lead	E605SB014	605SB01401	SW	123	J
Pesticides in Surface Soil (ug/Kg)					
Dieldrin	E005SB001	005SB00101	NE	2.78	U
Dieldrin	E005SB002	005SB00201	NE	2.6	U
Dieldrin	E005SB032	005SB03201	NE	3.5	J
Dieldrin	E005SB033	005SB03301	NE	2.6	U
Dieldrin	E005SB034	005SB03401	NE	2.7	U
Dieldrin	E005SB035	005SB03501	NE	0.55	J
Dieldrin	E018SB001	018SB00101a	NE	3.04	=
Dieldrin	E018SB002	018SB00201a	NE	2.87	U
Dieldrin	E018SB003	018SB00301a	NE	3.2	U
Dieldrin	E018SB004	018SB00401a	NE	2.6	U
Dieldrin	E018SB005	018SB00501a	NE	6.96	=
Dieldrin	E605SB001	605SB00101	NE	2.84	U
Dieldrin	E605SB002	605SB00201	NE	2.6	U
Dieldrin	E605SB009	605SB00901	NE	2.81	U
Dieldrin	E621SB001	621SB00101	NE	2.6	U
Dieldrin	E621SB002	621SB00201	NE	2.6	U
Dieldrin	E621SB003	621SB00301	NE	2.6	U
Dieldrin	E621SB004	621SB00401	NE	2.6	U
Dieldrin	E005SB037	005SB03701	SW	0.55	J
Dieldrin	E005SB038	005SB03801	SW	2.7	U

Table F-1

COPC Concentrations used in Statistical Evaluation

SWMU 5, 18, AOC 605, and 621; Zone E

Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Dieldrin	E605SB003	605SB00301	SW	5.01	=
Dieldrin	E605SB004	605SB00401	SW	3.29	U
Dieldrin	E605SB012	605SB01201	SW	2.8	U
Dieldrin	E605SB013	605SB01301	SW	2.6	U
Dieldrin	E605SB014	605SB01401	SW	3.3	U
Semivolatile Organic Compounds in Surface Soil (ug/Kg)					
BEQ	E605SB003	605SB00301	SW	1107	=
BEQ	E605SB004	605SB00401	SW	6201	=
BEQ	E605SB012	605SB01201	SW	370	=
BEQ	E605SB013	605SB01301	SW	1370	=
BEQ	E605SB014	605SB01401	SW	1350	=
BEQ	E005SB003	005SB00301	C	864	=
BEQ	E605SB005	605SB00501	C	878	U
BEQ	E605SB006	605SB00601	C	603	=
BEQ	E605SB007	605SB00701	C	560	=
BEQ	E605SB008	605SB00801	C	1265	=
BEQ	E605SB010	605SB01001	C	898	=
BEQ	E605SB011	605SB01101	C	898	=
BEQ	E605SB015	605SB01501	C	464	=
BEQ	E005SB001	005SB00101	NE	704	=
BEQ	E005SB002	005SB00201	NE	561	=
BEQ	E018SB001	018SB00101a	NE	863	=
BEQ	E018SB002	018SB00201a	NE	878	U
BEQ	E018SB003	018SB00301a	NE	644	=
BEQ	E018SB004	018SB00401a	NE	1650	=
BEQ	E018SB005	018SB00501a	NE	502	=
BEQ	E605SB001	605SB00101	NE	590	=
BEQ	E605SB002	605SB00201	NE	951	=
BEQ	E605SB009	605SB00901	NE	612	=
BEQ	E605SB017	605SB01701	NE	389	=
BEQ	E621SB001	621SB00101	NE	428	U
BEQ	E621SB002	621SB00201	NE	310	=
BEQ	E621SB003	621SB00301	NE	400	=
BEQ	E621SB004	621SB00401	NE	411	=
Metals in Subsurface Soil (mg/Kg)					
Antimony	E005SB003	005SB00302	C	0.57	J
Antimony	E605SB008	605SB00802	C	0.61	J
Antimony	E605SB006	605SB00602	C	0.59	J
Antimony	E605SB005	605SB00502	C	4.6	J
Antimony	E605SB015	605SB01502	C	15.6	=
Antimony	E605SB010	605SB01002	C	0.68	J
Antimony	E605SB011	605SB01102	C	0.59	J
Antimony	E005SB001	005SB00102	NE	5.4	J
Antimony	E005SB002	005SB00202	NE	0.73	=
Antimony	E018SB003	018SB00302a	NE	3.3	J

Table F-1
COPC Concentrations used in Statistical Evaluation
SWMU 5, 18, AOC 605, and 621; Zone E
Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Antimony	E018SB002	018SB00202a	NE	0.92	J
Antimony	E605SB017	605SB01702	NE	3.5	J
Antimony	E621SB001	621SB00102	NE	0.65	U
Antimony	E621SB002	621SB00202	NE	2.6	J
Antimony	E605SB002	605SB00202	NE	0.73	=
Antimony	E605SB009	605SB00902	NE	3.1	J
Antimony	E621SB003	621SB00302	NE	4.5	J
Antimony	E018SB005	018SB00502a	NE	2.3	J
Antimony	E605SB012	605SB01202	SW	9.8	=
Antimony	E605SB014	605SB01402	SW	12.5	=
Lead	E005SB003	005SB00302	C	10.7	J
Lead	E005SB011	005SB01102	C	74	=
Lead	E005SB016	005SB01602	C	14	=
Lead	E005SB021	005SB02102	C	960	=
Lead	E005SB022	005SB02202	C	16	=
Lead	E005SB023	005SB02302	C	19	=
Lead	E005SB024	005SB02402	C	86	=
Lead	E005SB025	005SB02502	C	37	=
Lead	E005SB026	005SB02602	C	51	=
Lead	E005SB027	005SB02702	C	1.3	=
Lead	E005SB048	005SB04802	C	2700	=
Lead	E005SB049	005SB04902	C	200	=
Lead	E005SB052	005SB05202	C	38	J
Lead	E005SB063	005SB06303	C	930	=
Lead	E605SB005	605SB00502	C	300	J
Lead	E605SB006	605SB00602	C	33.2	J
Lead	E605SB008	605SB00802	C	14.2	J
Lead	E605SB010	605SB01002	C	68.6	J
Lead	E605SB011	605SB01102	C	23.4	J
Lead	E605SB015	605SB01502	C	429	J
Lead	E005SB001	005SB00102	NE	283	J
Lead	E005SB002	005SB00202	NE	2.4	=
Lead	E005SB004	005SB00402	NE	92	=
Lead	E005SB005	005SB00502	NE	200	=
Lead	E005SB006	005SB00602	NE	140	=
Lead	E005SB007	005SB00702	NE	140	=
Lead	E005SB008	005SB00802	NE	7.6	=
Lead	E005SB009	005SB00902	NE	350	=
Lead	E005SB010	005SB01002	NE	200	=
Lead	E005SB012	005SB01202	NE	620	=
Lead	E005SB013	005SB01302	NE	700	=
Lead	E005SB014	005SB01402	NE	120	=
Lead	E005SB015	005SB01502	NE	470	=
Lead	E005SB032	005SB03202	NE	830	=
Lead	E005SB033	005SB03302	NE	550	=

Table F-1
COPC Concentrations used in Statistical Evaluation
SWMU 5, 18, AOC 605, and 621; Zone E
Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Lead	E005SB035	005SB03502	NE	52	=
Lead	E005SB050	005SB05002	NE	2100	=
Lead	E005SB051	005SB05102	NE	2200	=
Lead	E005SB053	005SB05302	NE	24	J
Lead	E005SB054	005SB05402	NE	2.4	=
Lead	E005SB055	005SB05502	NE	5700	J
Lead	E005SB056	005SB05602	NE	370	J
Lead	E005SB059	005SB05902	NE	840	J
Lead	E005SB060	005SB06003	NE	540	=
Lead	E005SB061	005SB06103	NE	820	=
Lead	E005SB062	005SB06203	NE	1100	=
Lead	E005SB064	005SB06403	NE	2.4	=
Lead	E005SB065	005SB06503	NE	245	=
Lead	E005SB069	005SB06903	NE	570	=
Lead	E005SB070	005SB07003	NE	329	=
Lead	E005SB071	005SB071N1	NE	19.9	=
Lead	E018SB002	018SB00202a	NE	54.5	J
Lead	E018SB003	018SB00302a	NE	76.3	J
Lead	E018SB005	018SB00502a	NE	199	J
Lead	E605SB002	605SB00202	NE	2.4	=
Lead	E605SB009	605SB00902	NE	200	J
Lead	E605SB017	605SB01702	NE	112	=
Lead	E621SB001	621SB00102	NE	36.7	J
Lead	E621SB002	621SB00202	NE	1320	J
Lead	E621SB003	621SB00302	NE	2210	J
Lead	E621SB005	621SB00502	NE	22	=
Lead	E621SB006	621SB00602	NE	19	=
Lead	E621SB007	621SB00702	NE	2.4	=
Lead	E621SB008	621SB00802	NE	950	=
Lead	E621SB009	621SB00902	NE	2.4	=
Lead	E621SB010	621SB01002	NE	1200	=
Lead	E621SB012	621SB01202	NE	530	=
Lead	E621SB013	621SB01302	NE	2.4	=
Lead	E621SB014	621SB01402	NE	420	=
Lead	E621SB015	621SB01502	NE	2.4	=
Lead	E621SB016	621SB01602	NE	230	=
Lead	E621SB017	621SB01702	NE	170	=
Lead	E621SB018	621SB01802	NE	1000	=
Lead	E621SB019	621SB01902	NE	2.4	=
Lead	E621SB020	621SB02002	NE	120	=
Lead	E621SB022	621SB02202	NE	290	=
Lead	E621SB023	621SB02302	NE	660	=
Lead	E621SB024	621SB02402	NE	45	=
Lead	E621SB025	621SB02502	NE	670	=
Lead	E621SB026	621SB02602	NE	120	=

Table F-1
 COPC Concentrations used in Statistical Evaluation
 SWMU 5, 18, AOC 605, and 621; Zone E
 Charleston Naval Complex, North Charleston, South Carolina

Chemical	Station ID	Sample ID	Exposure Area	Concentration	Qualifier
Metals in Surface Soil (mg/Kg)					
Lead	E621SB027	621SB02702	NE	37	=
Lead	E621SB028	621SB02802	NE	13	=

Site:	SWMU 5
Media:	Surface Soil
Units:	mg/Kg
Chemical:	Antimony
Exposure Area:	Central

STATISTICS

N	8
Detects	8
FOD	100%
Mean of Detect	6.09
Min of Detect	1.1
Max of Detect	23
Best Estimate of Mean (arithmetic)	6.09
Best Estimate of Mean (geometric)	4
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	11
<i>t-statistic</i>	1.90
UCL95 Lognormal	20
<i>H-statistic</i>	3.07
UCL95 Nonparametric	1.1
UCL95 Bootstrap	10.3

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	21.1601944
<i>coverage</i>	95%
UTL95 Lognormal	27.6232173
<i>coverage</i>	95%
UTL95 Nonparametric	23.40
<i>coverage</i>	89%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.694
W_{log}	0.940
$W_{\alpha = 0.05}$	0.818

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	mg/Kg
Chemical:	Antimony
Exposure Area:	Northeast

STATISTICS

N	15
Detects	14
FOD	93%
Mean of Detect	3.29
Min of Detect	0.9
Max of Detect	26
Best Estimate of Mean (arithmetic)	3.08
Best Estimate of Mean (geometric)	1
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	6
<i>t-statistic</i>	1.76
UCL95 Lognormal	5
<i>H-statistic</i>	2.74
UCL95 Nonparametric	0.86
UCL95 Bootstrap	5.70

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	14.80139343
<i>coverage</i>	95%
UTL95 Lognormal	9.598436215
<i>coverage</i>	95%
UTL95 Nonparametric	26.00
<i>coverage</i>	94%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.413
W_{log}	0.819
$W_{\alpha = 0.05}$	0.881

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: mg/Kg
Chemical: Antimony
Exposure Area: Southwest

STATISTICS

N	5
Detects	5
FOD	100%
Mean of Detect	9.88
Min of Detect	1.5
Max of Detect	19
Best Estimate of Mean (arithmetic)	9.88
Best Estimate of Mean (geometric)	7
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	16	
<i>t</i> -statistic	2.13	
UCL95 Lognormal	107	Exceeds Max Detect
<i>H</i> -statistic	4.48	
UCL95 Nonparametric	0	
UCL95 Bootstrap	14.1	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	25.08437411	
coverage	95%	
UTL95 Lognormal	72.97266606	
coverage	95%	
UTL95 Nonparametric	18.60	
coverage	83%	

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.998
W_{log}	0.892
$W_{\alpha = 0.05}$	0.762

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: mg/Kg
Chemical: Arsenic
Exposure Area: Central

STATISTICS

N	8
Detects	8
FOD	100%
Mean of Detect	3.98
Min of Detect	1.1
Max of Detect	9
Best Estimate of Mean (arithmetic)	3.98
Best Estimate of Mean (geometric)	3
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	6
<i>t-statistic</i>	1.90
UCL95 Lognormal	9
<i>H-statistic</i>	2.66
UCL95 Nonparametric	1.1
UCL95 Bootstrap	5.45

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	9.616945673
<i>coverage</i>	95%
UTL95 Lognormal	13.90459104
<i>coverage</i>	95%
UTL95 Nonparametric	8.80
<i>coverage</i>	89%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.891
W_{log}	0.961
$W_{\alpha = 0.05}$	0.818

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: mg/Kg
Chemical: Arsenic
Exposure Area: Northeast

STATISTICS

N	15
Detects	15
FOD	100%
Mean of Detect	3.09
Min of Detect	1.0
Max of Detect	8
Best Estimate of Mean (arithmetic)	3.09
Best Estimate of Mean (geometric)	2
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	4
<i>t-statistic</i>	1.76
UCL95 Lognormal	6
<i>H-statistic</i>	2.44
UCL95 Nonparametric	0.95
UCL95 Bootstrap	4.11

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	7.457334101
<i>coverage</i>	95%
UTL95 Lognormal	10.69871043
<i>coverage</i>	95%
UTL95 Nonparametric	7.80
<i>coverage</i>	94%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.835
W_{log}	0.793
$W_{\alpha = 0.05}$	0.881

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: mg/Kg
Chemical: Arsenic
Exposure Area: Southwest

STATISTICS

N	5
Detects	5
FOD	100%
Mean of Detect	13.06
Min of Detect	4.0
Max of Detect	19
Best Estimate of Mean (arithmetic)	13.06
Best Estimate of Mean (geometric)	12
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	18.6	Exceeds Max Detect
t-statistic	2.13	
UCL95 Lognormal	39.2	Exceeds Max Detect
H-statistic	3.29	
UCL95 Nonparametric	0	
UCL95 Bootstrap	16.8	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	26.65667852
coverage	95%
UTL95 Lognormal	49.70041135
coverage	95%
UTL95 Nonparametric	18.60
coverage	83%

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.917
W_{log}	0.812
$W_{\alpha = 0.05}$	0.762

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	mg/Kg
Chemical:	Copper
Exposure Area:	Central

STATISTICS

N	8
Detects	8
FOD	100%
Mean of Detect	421.48
Min of Detect	65.0
Max of Detect	1900
Best Estimate of Mean (arithmetic)	421
Best Estimate of Mean (geometric)	190.36
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	851	
<i>t</i> -statistic	1.90	
UCL95 Lognormal	2659	Exceeds Max Detect
<i>H</i> -statistic	3.90	
UCL95 Nonparametric	65	
UCL95 Bootstrap	761	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1708.649066
<i>coverage</i>	95%
UTL95 Lognormal	2369.446052
<i>coverage</i>	95%
UTL95 Nonparametric	1900.00
<i>coverage</i>	89%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.648
W_{log}	0.846
$W_{\alpha = 0.05}$	0.818

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	mg/Kg
Chemical:	Copper
Exposure Area:	Southwest

STATISTICS

N	5
Detects	5
FOD	100%
Mean of Detect	222.3
Min of Detect	37.5
Max of Detect	624
Best Estimate of Mean (arithmetic)	222.3
Best Estimate of Mean (geometric)	148.93
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	443	
<i>t-statistic</i>	2.13	
UCL95 Lognormal	2996	Exceeds Max Detect
<i>H-statistic</i>	4.91	
UCL95 Nonparametric	0	
UCL95 Bootstrap	378	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	762.7497629
<i>coverage</i>	95%
UTL95 Lognormal	1591.030399
<i>coverage</i>	95%
UTL95 Nonparametric	624.00
<i>coverage</i>	83%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.775
W_{log}	0.967
$W_{\alpha = 0.05}$	0.762

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	mg/Kg
Chemical:	Lead
Exposure Area:	Central

STATISTICS

N	20
Detects	20
FOD	100%
Mean of Detect	677
Min of Detect	2.4000
Max of Detect	1900.00
Best Estimate of Mean (arithmetic)	677
Best Estimate of Mean (geometric)	323.9
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	884
<i>t-statistic</i>	1.73
UCL95 Lognormal	10666 Exceeds Max Detect
<i>H-statistic</i>	4.02
UCL95 Nonparametric	177
UCL95 Bootstrap	863

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1625
<i>coverage</i>	95%
UTL95 Lognormal	9017
<i>coverage</i>	95%
UTL95 Nonparametric	1900
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.943
W_{log}	0.747
$W_{\alpha = 0.05}$	0.905

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: mg/Kg
Chemical: Lead
Exposure Area: Norhteast

STATISTICS

N	59
Detects	59
FOD	100%
Mean of Detect	317
Min of Detect	2.4000
Max of Detect	2400.00
Best Estimate of Mean (arithmetic)	317
Best Estimate of Mean (geometric)	29.9
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	431
<i>t-statistic</i>	1.68
UCL95 Lognormal	4126 Exceeds Max Detect
<i>H-statistic</i>	3.97
UCL95 Nonparametric	205
UCL95 Bootstrap	427

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1200
<i>coverage</i>	95%
UTL95 Lognormal	2732
<i>coverage</i>	95%
UTL95 Nonparametric	#N/A
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	Unknown
W_{normal}	--
W_{log}	--
$W_{\alpha = 0.05}$	--

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: mg/Kg
Chemical: Lead
Exposure Area: Southwest

STATISTICS

N	11
Detects	11
FOD	100%
Mean of Detect	423
Min of Detect	100
Max of Detect	1900
Best Estimate of Mean (arithmetic)	423
Best Estimate of Mean (geometric)	254
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	719
<i>t</i> -statistic	1.81
UCL95 Lognormal	961
<i>H</i> -statistic	2.82
UCL95 Nonparametric	110
UCL95 Bootstrap	683

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1450
coverage	95%
UTL95 Lognormal	1584
coverage	95%
UTL95 Nonparametric	1900
coverage	92%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.652
W_{log}	0.866
$W_{\alpha = 0.05}$	0.850

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	ug/Kg
Chemical:	Dieldrin
Exposure Area:	Northeast

STATISTICS

N	18
Detects	4
FOD	22%
Mean of Detect	3.51
Min of Detect	0.5500
Max of Detect	6.96
Best Estimate of Mean (arithmetic)	1.84
Best Estimate of Mean (geometric)	1.6
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	2
<i>t-statistic</i>	1.74
UCL95 Lognormal	2
<i>H-statistic</i>	2.03
UCL95 Nonparametric	1.3
UCL95 Bootstrap	2.37

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	4.42
<i>coverage</i>	95%
UTL95 Lognormal	4.00
<i>coverage</i>	95%
UTL95 Nonparametric	6.96
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.547
W_{log}	0.727
$W_{\alpha = 0.05}$	0.897

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	ug/Kg
Chemical:	Dieldrin
Exposure Area:	Southwest

STATISTICS

N	7
Detects	2
FOD	29%
Mean of Detect	2.78
Min of Detect	0.5500
Max of Detect	5.01
Best Estimate of Mean (arithmetic)	1.84
Best Estimate of Mean (geometric)	1.5
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	3
<i>t-statistic</i>	1.94
UCL95 Lognormal	4
<i>H-statistic</i>	2.67
UCL95 Nonparametric	0
UCL95 Bootstrap	2.75

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	4.84
<i>coverage</i>	95%
UTL95 Lognormal	5.82
<i>coverage</i>	95%
UTL95 Nonparametric	5.01
<i>coverage</i>	88%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.685
W_{log}	0.868
$W_{\alpha = 0.05}$	0.803

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Surface Soil
Units: ug/Kg
Chemical: BEQs
Exposure Area: Southwest

STATISTICS

N	5
Detects	5
FOD	100%
Mean of Detect	2080
Min of Detect	370
Max of Detect	6201
Best Estimate of Mean (arithmetic)	2080
Best Estimate of Mean (geometric)	1363
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	4310
<i>t-statistic</i>	2.13
UCL95 Lognormal	26532 Exceeds Max Detect
<i>H-statistic</i>	4.91
UCL95 Nonparametric	0
UCL95 Bootstrap	3606

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	7543
<i>coverage</i>	95%
UTL95 Lognormal	14240
<i>coverage</i>	95%
UTL95 Nonparametric	6201
<i>coverage</i>	83%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.709
W_{log}	0.917
$W_{\alpha = 0.05}$	0.762

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Surface Soil
Units:	ug/Kg
Chemical:	BEQs
Exposure Area:	SWMU 5

STATISTICS

N	28
Detects	25
FOD	89%
Mean of Detect	981
Min of Detect	310
Max of Detect	6201
Best Estimate of Mean (arithmetic)	915
Best Estimate of Mean (geometric)	692
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	1268
<i>t-statistic</i>	1.70
UCL95 Lognormal	1111
<i>H-statistic</i>	2.06
UCL95 Nonparametric	484.3
UCL95 Bootstrap	1269

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	2816
<i>coverage</i>	95%
UTL95 Lognormal	2149
<i>coverage</i>	95%
UTL95 Nonparametric	6201
<i>coverage</i>	97%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.478
W_{log}	0.920
$W_{\alpha = 0.05}$	0.924

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Subsurface Soil
Units: mg/Kg
Chemical: Antimony
Exposure Area: Central

STATISTICS

N	7
Detects	7
FOD	100%
Mean of Detect	3.32
Min of Detect	0.6
Max of Detect	16
Best Estimate of Mean (arithmetic)	3.32
Best Estimate of Mean (geometric)	1
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	7
<i>t-statistic</i>	1.94
UCL95 Lognormal	35 Exceeds Max Detect
<i>H-statistic</i>	4.43
UCL95 Nonparametric	0
UCL95 Bootstrap	6.49

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	14.98474612
<i>coverage</i>	95%
UTL95 Lognormal	20.62461117
<i>coverage</i>	95%
UTL95 Nonparametric	15.60
<i>coverage</i>	88%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.593
W_{log}	0.684
$W_{\alpha = 0.05}$	0.803

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Subsurface Soil
Units: mg/Kg
Chemical: Antimony
Exposure Area: Northeast

STATISTICS

N	11
Detects	10
FOD	91%
Mean of Detect	2.71
Min of Detect	0.7
Max of Detect	5
Best Estimate of Mean (arithmetic)	2.49
Best Estimate of Mean (geometric)	2
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	3	
<i>t</i> -statistic	1.81	
UCL95 Lognormal	6	Exceeds Max Detect
<i>H</i> -statistic	2.82	
UCL95 Nonparametric	0.73	
UCL95 Bootstrap	3.28	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	5.655527402	
<i>coverage</i>	95%	
UTL95 Lognormal	10.38523951	
<i>coverage</i>	95%	
UTL95 Nonparametric	5.40	
<i>coverage</i>	92%	

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.936
W_{log}	0.895
$W_{\alpha=0.05}$	0.850

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Subsurface Soil
Units: mg/Kg
Chemical: Antimony
Exposure Area: Southwest

STATISTICS

N	2
Detects	2
FOD	100%
Mean of Detect	11.15
Min of Detect	9.8
Max of Detect	13
Best Estimate of Mean (arithmetic)	11.15
Best Estimate of Mean (geometric)	11.07
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	20	Exceeds Max Detect
<i>t</i> -statistic	6.31	
UCL95 Lognormal		
<i>H</i> -statistic	#N/A	
UCL95 Nonparametric	#VALUE!	
UCL95 Bootstrap	12.73	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	25.91382788
coverage	95%
UTL95 Lognormal	41.87518447
coverage	95%
UTL95 Nonparametric	12.50
coverage	67%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	1.000
W_{log}	1.000
$W_{\alpha = 0.05}$	#N/A

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 5
Media:	Subsurface Soil
Units:	mg/Kg
Chemical:	Lead
Exposure Area:	Central

STATISTICS

N	20
Detects	20
FOD	100%
Mean of Detect	300
Min of Detect	1
Max of Detect	2700
Best Estimate of Mean (arithmetic)	300
Best Estimate of Mean (geometric)	64
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	545
<i>t-statistic</i>	1.73
UCL95 Lognormal	1895
<i>H-statistic</i>	4.02
UCL95 Nonparametric	16
UCL95 Bootstrap	527

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1422
<i>coverage</i>	95%
UTL95 Lognormal	1664
<i>coverage</i>	95%
UTL95 Nonparametric	2700
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.518
W_{log}	0.964
$W_{\alpha = 0.05}$	0.905

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site: SWMU 5
Media: Subsurface Soil
Units: mg/Kg
Chemical: Lead
Exposure Area: Northeast

STATISTICS

N	62
Detects	62
FOD	100%
Mean of Detect	489
Min of Detect	2
Max of Detect	5700
Best Estimate of Mean (arithmetic)	489
Best Estimate of Mean (geometric)	122
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	669
<i>t-statistic</i>	1.66
UCL95 Lognormal	2894
<i>H-statistic</i>	3.35
UCL95 Nonparametric	350
UCL95 Bootstrap	658

95% UPPER TOLERANCE INTERVAL

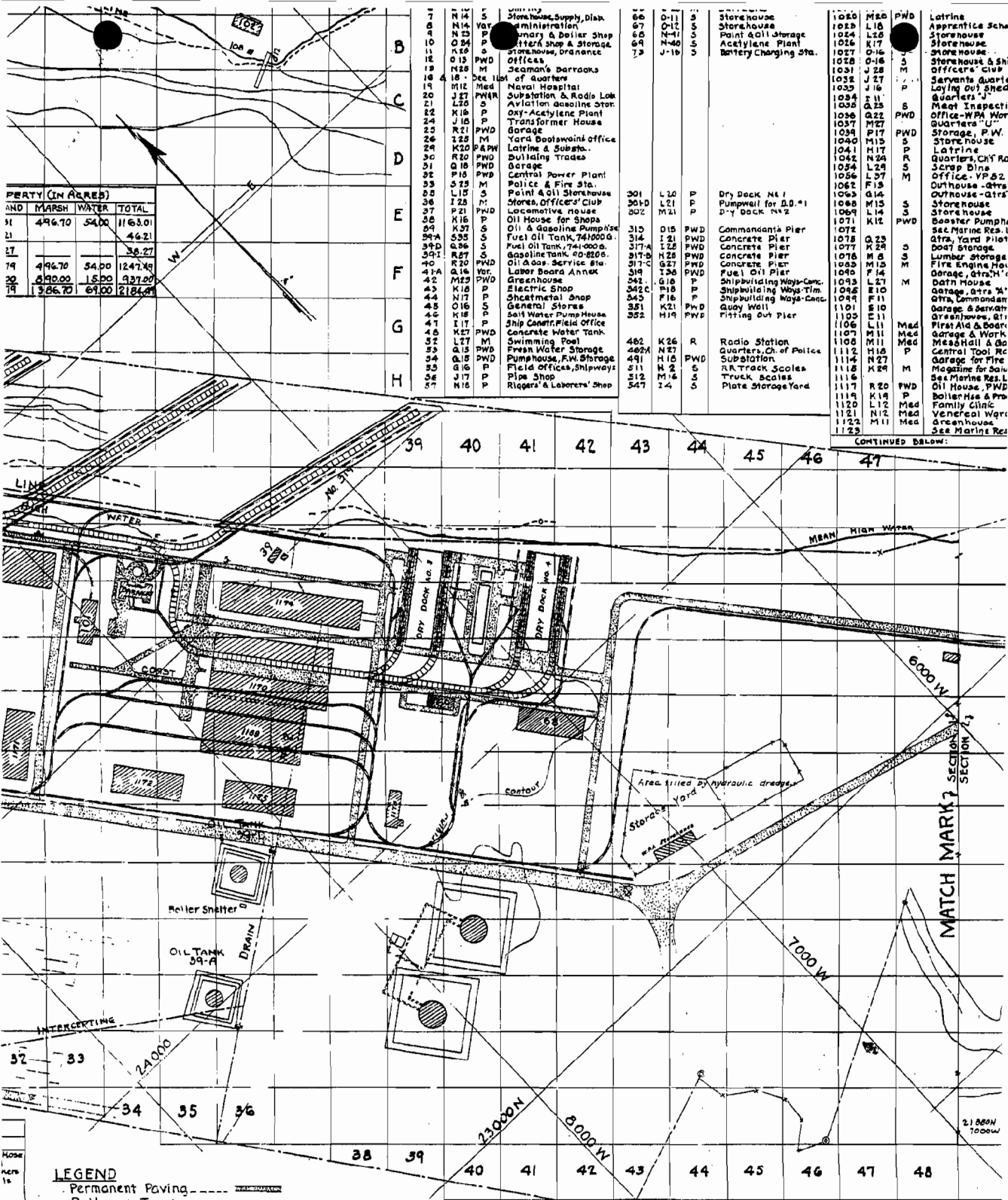
UTL95 Normal	1916
<i>coverage</i>	95%
UTL95 Lognormal	4251
<i>coverage</i>	95%
UTL95 Nonparametric	#N/A
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	Unknown
W_{normal}	—
W_{log}	—
$W_{\alpha = 0.05}$	—

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.



PARTY (IN ACRES)		
LAND	WATER	TOTAL
11	496.70	54.00
21		1163.01
27		46.21
29	496.70	54.00
30	496.70	54.00
31	496.70	54.00
32	496.70	54.00
33	496.70	54.00
34	496.70	54.00
35	496.70	54.00
36	496.70	54.00
37	496.70	54.00
38	496.70	54.00
39	496.70	54.00
40	496.70	54.00
41	496.70	54.00
42	496.70	54.00
43	496.70	54.00
44	496.70	54.00
45	496.70	54.00
46	496.70	54.00
47	496.70	54.00
48	496.70	54.00

- 7 N14 S Storehouse, Supply, Dish
- 8 N14 S Administration
- 9 N14 S Storehouse, Supply, Dish
- 10 N14 S Storehouse, Supply, Dish
- 11 N14 S Storehouse, Supply, Dish
- 12 N14 S Storehouse, Supply, Dish
- 13 N14 S Storehouse, Supply, Dish
- 14 N14 S Storehouse, Supply, Dish
- 15 N14 S Storehouse, Supply, Dish
- 16 N14 S Storehouse, Supply, Dish
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- 18 N14 S Storehouse, Supply, Dish
- 19 N14 S Storehouse, Supply, Dish
- 20 N14 S Storehouse, Supply, Dish
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- 38 N14 S Storehouse, Supply, Dish
- 39 N14 S Storehouse, Supply, Dish
- 40 N14 S Storehouse, Supply, Dish
- 41 N14 S Storehouse, Supply, Dish
- 42 N14 S Storehouse, Supply, Dish
- 43 N14 S Storehouse, Supply, Dish
- 44 N14 S Storehouse, Supply, Dish
- 45 N14 S Storehouse, Supply, Dish
- 46 N14 S Storehouse, Supply, Dish
- 47 N14 S Storehouse, Supply, Dish
- 48 N14 S Storehouse, Supply, Dish

- 301 L20 P Dry Dock No. 1
- 302 L21 P Pumping for D.B. #1
- 303 M21 P Dry Dock No. 2
- 315 015 PWD Commandant's Pier
- 316 121 PWD Concrete Pier
- 317 122 PWD Concrete Pier
- 318 123 PWD Concrete Pier
- 319 124 PWD Concrete Pier
- 320 125 PWD Fuel Oil Pier
- 321 126 PWD Shipbuilding Ways-Cent.
- 322 127 PWD Shipbuilding Ways-Tim.
- 323 128 PWD Shipbuilding Ways-Cent.
- 324 129 PWD Quay Wall
- 325 130 PWD Fitting Out Pier
- 462 K26 R Radio Station
- 463 N27 PWD Quarters, Ch. of Police
- 464 H28 PWD Substation
- 465 H29 PWD R.R. Track Scales
- 466 M20 S Truck Scales
- 467 M21 S Plate Storage Yard

- 1020 M20 PWD Latrine
- 1021 L18 PWD Apprentice School
- 1022 L18 PWD Storehouse
- 1023 K17 PWD Storehouse
- 1024 K17 PWD Storehouse
- 1025 K17 PWD Storehouse
- 1026 K17 PWD Storehouse
- 1027 K17 PWD Storehouse
- 1028 K17 PWD Storehouse
- 1029 K17 PWD Storehouse
- 1030 K17 PWD Storehouse
- 1031 K17 PWD Storehouse
- 1032 K17 PWD Storehouse
- 1033 K17 PWD Storehouse
- 1034 K17 PWD Storehouse
- 1035 K17 PWD Storehouse
- 1036 K17 PWD Storehouse
- 1037 K17 PWD Storehouse
- 1038 K17 PWD Storehouse
- 1039 K17 PWD Storehouse
- 1040 K17 PWD Storehouse
- 1041 K17 PWD Storehouse
- 1042 K17 PWD Storehouse
- 1043 K17 PWD Storehouse
- 1044 K17 PWD Storehouse
- 1045 K17 PWD Storehouse
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- 1123 K17 PWD Storehouse

- LEGEND**
- Permanent Paving
 - Railroad Tracks
 - Crane Tracks
 - Capstans
 - Hydrants
 - Fire Alarms, on Poles
 - Fire Alarms, on Buildings
 - Ammunition Depot
 - Military Department
 - Planning Division
 - Medical Department
 - Production Division
 - Public Works Division
 - Radio
 - Supply Department

DATUM PLANE is Mean Low Water = 0
 Extreme Low Water = -2.5
 Mean High Water = +5.6
 Extreme High Water (Aug. 11, 1940) = +10.7

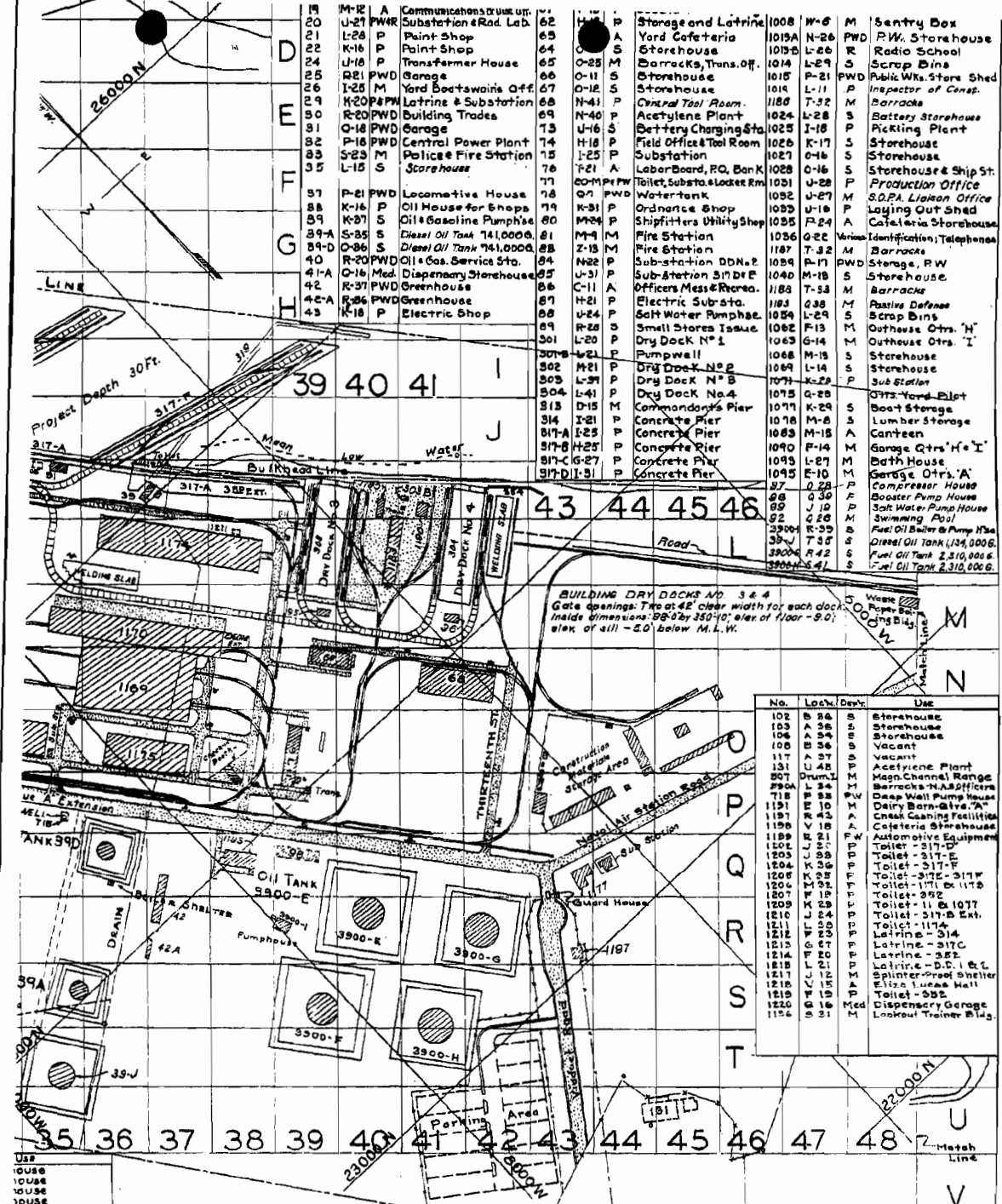
DRY DOCK NO. 1
 Maximum Ship Length 610'; Beam 101'; Draft 29' 4"
 At Mean High Water
DRY DOCK NO. 2
 Maximum Ship Length 495'; Beam 101'; Draft 21' 0"

Scale in Feet.
 0 100 200 400 600 800 1000

U.S. NAVY YARD
CHARLESTON, S.C.
SECTION 1
JUNE 30, 1941.

FOR OFFICIAL USE ONLY H606-41

Captain, CEC, U.S.N. Public Works Office



REFERENCES

DRY DOCK NO 1
Maximum Ship Length 610'; Beam 101'; Draft 29'-9 1/2"
At Mean High Water

DRY DOCK NO 2
Maximum Ship Length 495'; Beam 101'; Draft 21'-0"

Production Division P.
Public Works Division P.W.D.
Radio Dept. R.
Supply Dept. S.
Datum Plane is Mean Low Water = 0
Mean High Water = +5.6
Extreme Low Water = -2.5
Extreme High Water (Aug. 11, 1940) = +10.73

FOR OFFICIAL USE ONLY H-606-42-1

Scale in Feet

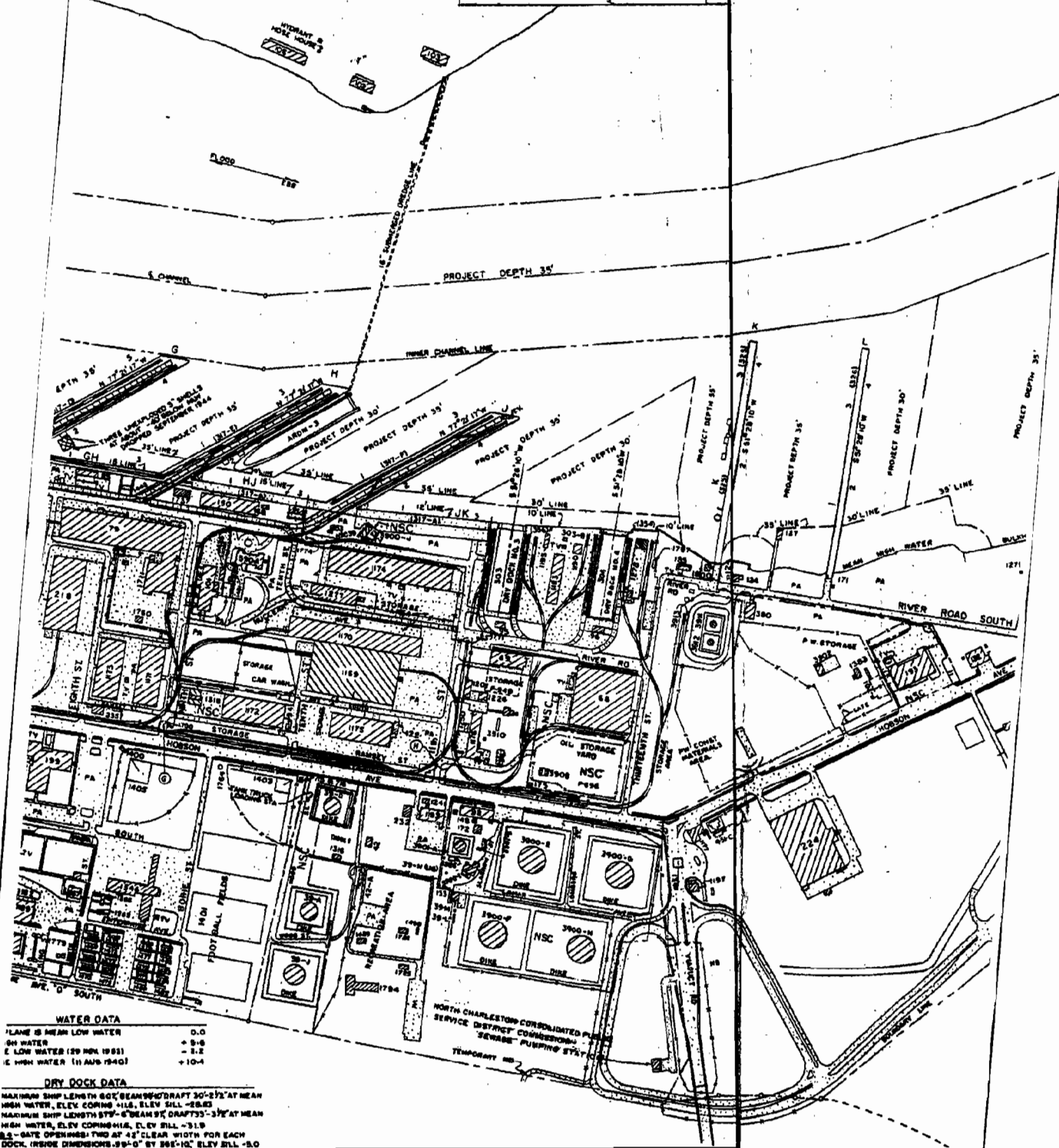
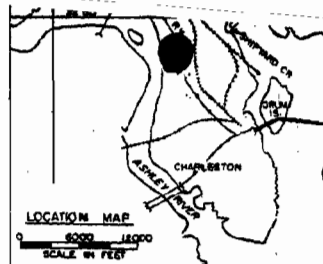
0 100 200 400 600 800 1000

1" = 200'

U. S. NAVY YARD
CHARLESTON, S. C.
JUNE 30, 1943
SECTION I
E. C. Seibert
Captain CEC., USN, Public Works Officer

Make standard width and longer CHARLESTON, S.C. 6-12



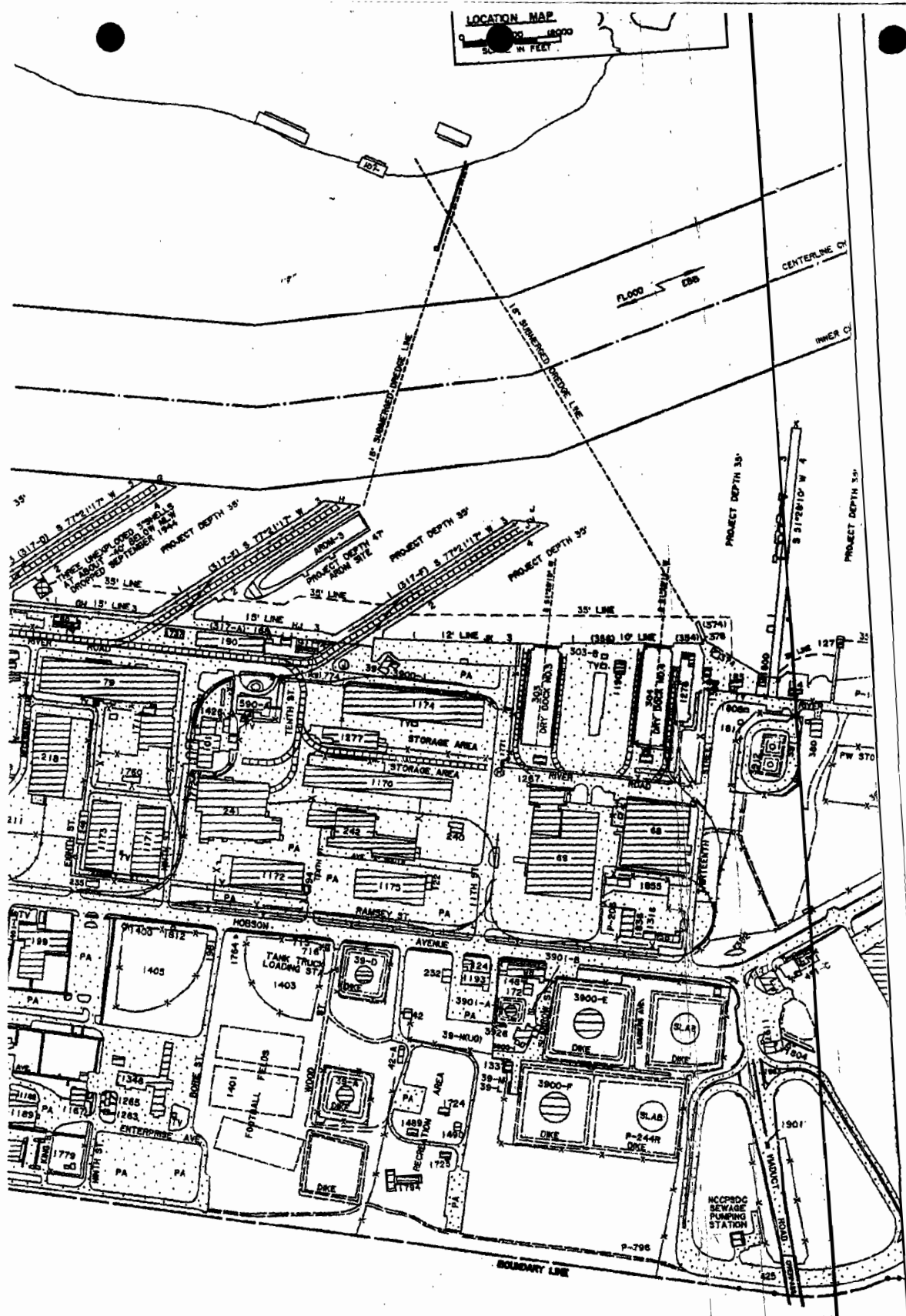


WATER DATA
 1. MEAN LOW WATER 0.0
 2. HIGH WATER (20 NOV 1983) +0.8
 3. LOW WATER (20 NOV 1983) -0.2
 4. HIGH WATER (11 AUG 1983) +10.4

DRY DOCK DATA
 MAXIMUM SHIP LENGTH 60' BEAM 18' DRAFT 30'-2 1/2' AT MEAN HIGH WATER, ELEV. COPIES -11.5, ELEV. BILL -28.0
 MAXIMUM SHIP LENGTH 57' BEAM 15' DRAFT 30'-2 1/2' AT MEAN HIGH WATER, ELEV. COPIES -11.5, ELEV. BILL -28.0
 2.5' GATE OPENINGS TWO AT 42' CLEAR WIDTH FOR EACH DOCK (INSIDE DIMENSIONS 39'-0" BY 36'-10" ELEV. BILL -3.0 BELOW MEAN LOW WATER, ELEV. FLOOR -9.0)
 MAXIMUM SHIP LENGTH 70' BEAM 10'-7" DRAFT 32'-2 1/2' AT MEAN HIGH WATER, ELEV. COPIES -11.5, ELEV. BILL -31.0

0' 200' 400' 600'
 GRAPHIC SCALE

DRAWN: ZEIGLER		DEPARTMENT OF THE NAVY	
CHECKED: WINSTEAD		NAVAL FACILITIES ENGINEERING COMMAND	
BY: PAKA		CHARLESTON NAVAL SHIPYARD CHARLESTON, S.C.	
DATE: 12/8/77		MAP OF CHARLESTON NAVAL SHIPYARD NAVAL STATION AND CONTIGUOUS ACTIVITIES EXISTING AND PLANNED AS OF 1 OCTOBER 1977	
SCALE: 1" = 200'		P. 10. 000000 000	
DATE: 12/8/77		H608-247	



DESIGN SIMMS CHECKED WINSTEAD BY SVENDSEN APPROVED <i>[Signature]</i> 4/24/87 SUPERVISOR ENGINEERING DIVISION DATE 4/24/87 PUBLIC WORKS OFFICE SATISFACTORY TO		DEPARTMENT OF THE NAVY CHARLESTON NAVAL SHIPYARD MAP OF CHARLESTON NAVAL SHIPYARD NAVAL STATION AND CONTIGUOUS ACTIVITIES EXISTING AND PLANNED AS OF 1 JANUARY 1987 SCALE 1" = 500' SHEET 1 OF 2		NAVAL FACILITIES ENGINEERING COMMAND CHARLESTON, S.C. W. Drawing No. 606-268
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Appendix H

Dioxin Equivalent (TEQ) Calculations\

	Units	TEF	E605GW001 605GW00102	E605GW002 605GW00202	E605GW003 605GW00302	E605GW003 605HW00301	E605GW003 605HW00302
Furans							
TETRACHLORODIBENZOFURAN (TOTAL)	pg/L	NA	2.49 U	1.19 U	1.45 U	2.23 U	1.30 U
2,3,7,8-TETRACHLORODIBENZOFURAN	pg/L	0.1	2.49 U	1.19 U	1.45 U	2.23 U	1.30 U
PENTACHLORODIBENZOFURAN (TOTAL)	pg/L	NA	2.02 U	2.96 U	2.18 U	3.21 U	1.91 U
1,2,3,7,8-PENTACHLORODIBENZOFURAN	pg/L	0.05	2.10 U	2.90 U	2.14 U	3.20 U	1.88 U
2,3,4,7,8-PENTACHLORODIBENZOFURAN	pg/L	0.5	2.02 U	2.96 U	2.18 U	3.21 U	1.91 U
HEXACHLORODIBENZOFURAN (TOTAL)	pg/L	NA	1.24 U	0.608 U	0.965 U	2.98 U	1.08 U
1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	pg/L	0.1	1.70 U	1.01 U	1.60 U	4.65 U	1.79 U
1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	pg/L	0.1	1.24 U	0.608 U	0.965 U	2.98 U	1.08 U
2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	pg/L	0.1	1.59 U	0.943 U	1.49 U	626 J	1.67 U
1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	pg/L	0.1	1.68 U	1.07 U	1.69 U	4.59 U	1.89 U
HEPTACHLORODIBENZOFURAN (TOTAL)	pg/L	NA	3.17 U	1.26 U	1.44 U	3.62 U	1.13 U
1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	pg/L	0.01	5.90 J	4.26 J	3.28 J	3.62 U	1.72 J
1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	pg/L	0.01	3.65 U	1.75 U	2.01 U	4.36 U	1.58 U
OCTACHLORODIBENZOFURAN	pg/L	0.001	3.67 J	5.12 J	6.69 J	4.76 U	1.89 J
			0.063	0.048	0.039	62.6	0.019
Dioxins							
TETRACHLORODIBENZO-p-DIOXIN (TOTAL)	pg/L	NA	5.12 U	2.00 U	1.60 U	5.10 U	2.27 U
2,3,7,8-TETRACHLORODIBENZO-p-DIOXIN	pg/L	1	5.12 U	2.00 U	1.60 U	5.10 U	2.27 U
PENTACHLORODIBENZO-p-DIOXIN (TOTAL)	pg/L	NA	2.66 U	1.96 U	2.64 U	5.26 U	2.61 U
1,2,3,7,8-PENTACHLORODIBENZO-p-DIOXIN	pg/L	0.5	2.66 U	1.96 U	2.64 U	5.26 U	2.61 U
HEXACHLORODIBENZO-p-DIOXIN (TOTAL)	pg/L	NA	2.52 U	1.83 U	1.59 U	3.15 U	2.88 U
1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	pg/L	0.1	3.47 U	3.07 U	2.67 U	5.03 U	4.83 U
1,2,3,6,7,8-HEXACHLORODIBENZO-p-DIOXIN	pg/L	0.1	2.52 U	1.83 U	1.59 U	3.15 U	2.88 U
1,2,3,7,8,9-HEXACHLORODIBENZO-p-DIOXIN	pg/L	0.1	2.62 U	2.23 U	1.94 U	3.66 U	3.51 U
HEPTACHLORODIBENZO-p-DIOXIN (TOTAL)	pg/L	NA	3.65 U	1.82 U	3.55 =	3.51 U	2.67 U
1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	pg/L	0.01	3.65 U	1.82 U	3.55 J	3.51 U	2.67 U
OCTACHLORODIBENZO-p-DIOXIN	pg/L	0.001	22.6 J	16.8 J	20.5 J	4.20 U	14.2 J
			0.023	0.017	0.056	0.000	0.014
TCDD Equivalent concentration from furans and dioxins =			0.085	0.065	0.095	62.6	0.033

**Responses To Comments from Eric F. Cathcart — SCDHEC
for Draft Zone E RCRA Facility Investigation Report
Charleston Naval Complex**

Site-Specific Comments for SWMU 5,18, AOC 605

Comment 4

Page 10.1-39 (line 10) Data from the first quarter sampling event were used to assess groundwater exposure pathways. It would be useful to use data from other quarterly sampling events. The navy should explain the exclusive use of first quarter data.

EnSafe Response 4

The point is well founded, however, considering that the project as a whole was on a “fast track” and due to the vast amount of data going into the report, only the first quarter of validated groundwater data was used to assess the exposure pathway. Nonetheless, all four quarters of validated groundwater data were reviewed and taken into consideration prior to the submittal of the report.

If any significant changes occurred in subsequent quarterly sampling events, these changes were considered and are reflected in the risk assessment summaries, the recommendations, and conclusions. Groundwater summary tables providing results from all quarterly sampling events are provided in Appendix H, part 1 of the draft report. All results, including the data qualifiers and non-detections for validated data will be provided Appendix H, part 2, in the Final Zone E RFI Report.

CH2M-Jones Response

CH2M-Jones evaluated the analytical results from all four RFI groundwater sampling events as well as samples collected subsequent to the RFI. These data are presented in the RFI Report Addendum

Comment 5

Section 10.1.7, Page 10.1-100, Lines 8 and 9: The text refers to an interim action removal at SWMUs 5, 18, and AOC 605 that has eliminated the associated risk. No information was provided to support this assumption. More detail should be given regarding post removal contaminant levels or confirmation sampling. Based on remaining levels of contaminants, it may be necessary to conduct a post removal risk assessment.

EnSafe Response 5

The risk assessment for this site was based on data collected prior to an IM conducted by the Detachment. Section 10.1.7, page 10.1-100, lines 8 and 9 will be changed to read “The Navy conducted an interim action which resulted in the excavation and offsite disposal of the upper and lower soil interval.” The IM Report will be reviewed and a determination will be made as to whether a separate risk assessment will be conducted for this site using post IM sample results.

CH2M-Jones Response 5

The residual risk at SWMU 5 has been re-evaluated based on current site conditions. The analytical results from samples that were removed during the IMs conducted at the site(s) were replaced with the analytical results for the fill material used to fill the excavations. This resulted in a risk evaluation that is representative of current site conditions. These data and the risk evaluation are presented in the RFI Report Addendum for SWMU 5.

**Responses To Comments from Dynamac/Gannett Fleming
for Draft Zone E RCRA Facility Investigation Report
Charleston Naval Complex**

General Comments

Comment 4

For many of the sites, compounds identified as COCs in the Corrective Measures Considerations section for each site (Section 10) do not match the list of compounds selected as COCs in the Potential Corrective Measures Table for a particular site. For example, for the combined site, SWMUs 5 and 18 and AOC 605 (page 10.1-100), zinc was identified as a COC in the upper soil interval. However, zinc is not listed in the Potential Corrective Measures Table for that site (Table 10.1.7.1, page 10.1-101). Also, antimony was identified in the text (page 10.1-101) as a COC in shallow groundwater, but was not included in the Potential Corrective Measures Table. The conclusions in the text and tables for each site must be in agreement.

EnSafe Response 4

These inconsistencies will be addressed, and revisions will be included in the Final Zone E RFI Report.

CH2M-Jones Response 4

Review of the data has been completed and CH2M-Jones has identified the appropriate COCs for further evaluation. These COCs are discussed in the RFI Report Addendum.

Site-Specific Comments for SWMU 5,18, AOC 605

Comment 1

Table 10.1.6.13, Page 10.1-87: “HI” is defined in a footnote to the table but is not used in the table. The last row in the table designated “Surface Soil Pathway Sum” should be renamed “Soil Surface Pathway Sum HI/ILCR”.

EnSafe Response 1

Noted.

CH2M-Jones Response 4

No additional response.

**Responses to Engineering Comments (Mr. Gil Rennhack, 31 May 2002)
Phase II Interim Measure Work Plan, dated April 2002: Soil Removal
SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E
Charleston Naval Complex, SC0 170 022 560**

1. This document proposes to collect additional subsurface soil samples in the 1 to 3 foot interval. As discussed in the conference call between the Department and CH2M-Jones on May 30, 2002, CH2M-Jones agreed to locate these additional soil samples (1 to 3 foot interval) in locations bracketed by elevated lead concentrations in the surface soil and underlying subsurface soil (3 to 5 foot interval). These specific locations were discussed in the conference call.

CH2M-Jones Response

CH2M-Jones agreed to relocate the intermediate interval samples to the locations recommended by SCDHEC. They were collected as agreed on September 5, 2002 and the results were presented in the Phase II Interim Measure Work Plan Addendum 2 for SWMU 5, SWMU 18, AOC 605, and AOC 621 (CH2M-Jones, 2002).

2. For areas requiring subsurface soil excavation, CH2M-Jones agreed to collect confirmation samples at the base of the excavation to ensure that a potential source of lead contamination is not left in place. If the base of the excavation should extend into the saturated zone, confirmation samples will still be collected; however, a majority of the moisture will be removed from the sample prior to analysis to obtain more representative results of the subsurface soil conditions.

CH2M-Jones Response

CH2M-Jones agreed to collect confirmation samples from the bottom of the deep excavation areas as recommended by SCDHEC. The depth of the excavation extended into the saturated zone, however it was not necessary to remove excess water from the confirmation samples as the excavation terminated within a dense clay unit that did not contain excess water. The samples were collected as agreed on October 16, 2002 and January 9, 2003. The results are presented in the attached RFI Report Addendum for SWMU 5, SWMU 18, AOC 605, and AOC 621.

Responses to Hydrogeology Comments (Mrs. Jo Cherie Overcash, 31 May 2002)
Phase II Interim Measure Work Plan, dated April 2002: Soil Removal
SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E
Charleston Naval Complex, SC

The goal of this April 2002 Phase II IMWP is to excavate lead contaminated surface and subsurface soils. This IMWP does not include groundwater activities. The Division of Hydrogeology has identified two concerns regarding the soil excavation activities as proposed in this Phase II IMWP:

1. The proposed abandonment of monitoring well E605GW006; and
2. The proximity of monitoring well E605GW004 to the proposed excavation area.

Monitoring well E605GW006 was installed November 15, 2001, and has been sampled only one time. At a minimum, the Navy must collect one additional groundwater sample from E605GW006 to be analyzed for lead. See the Groundwater discussion below for details.

Monitoring well E605GW004 is located between the proposed northern and southern surface soil excavation areas. The Navy must ensure that the integrity of this well is not compromised during the excavation activities. If this well is damaged, the Navy must propose to install a replacement monitoring well. Data from this location is imperative to a groundwater decision for these units.

Groundwater

This Phase II Interim Measure Workplan (Phase II IMWP) includes the results of the additional soil investigation and analytical results of groundwater samples collected during the Phase I IMWP, which was approved November 21, 2001. According to Table 2-4 entitled Detected Inorganic Compounds from Phase I IM Groundwater sampling, the following five metals were detected: arsenic, barium, chromium (total), lead and mercury. Lead exceeded its Treatment Technique Action Level of 15 micrograms per liter ($\mu\text{g/L}$) in the one sample collected from monitoring well E605GW004 (21.4 $\mu\text{g/L}$) and was also detected in monitoring wells E605GW005 and E605GW006.

In this Phase II IMWP, the Navy has proposed to abandon E605GW006 due to its location within the targeted soils excavation area. However, the Navy should collect one additional groundwater sample from E605GW006 prior to abandonment in order to confirm lead concentrations in that area.

If the Navy chooses to abandon E605GW006 without collecting an additional groundwater sample, the Navy must replace this well following excavation activities and then collect a groundwater sample for laboratory analysis.

Moreover, the Navy must collect a minimum of two additional groundwater samples from monitoring wells E605GW004 and E605GW005. The first sample should be collected immediately from each well and the second sample should be collected within three months of completion of contaminated soil excavation. The rationale for the continued groundwater assessment is to confirm that the concentration of lead in groundwater no longer poses a threat. The basis for continued groundwater assessment is as follows:

- The concentration of lead in the E605GW002/004 location has varied widely over time.

Monitoring well E605GW004 is a replacement well for damaged and abandoned monitoring well E605GW002. As these wells monitor groundwater quality virtually in the same location, data from these wells should be evaluated as from one location. Although the concentration of lead at 21.4 µg/L during the November 2001 sampling event was only slightly elevated above the action level of 15µg/L, it is best to note that the concentration of lead in groundwater has fluctuated widely in this location. According to data included on Table 4-5 entitled Lead Concentrations in Monitoring Well E605GW002, the lead concentrations have been as follows:

March 20, 1996	426 µg/L
July 2, 1996	68 µg/L
October 28, 1996	404 µg/L
January 7, 1997	1,970 µg/L

The decrease in lead concentration in the groundwater sample collected from E605GW004 during the Phase I IMWP may be a result of natural fluctuation or it may be the result of the removal of the source, contaminated soils. Further verification of current groundwater quality is needed.

- Lead in soil failed the Synthetic Precipitation Leaching Procedure (SPLP). According to Table 2-3 entitled SPLP Results lead was detected at 20,000 µg/L in the leachate from the shallow soil sample collected at the E005SB055 location. This soil sampling location is in the vicinity of monitoring well E605GW004. This Phase II IMWP proposes to excavate soil in the E005SB055 area. Groundwater quality should be determined following soil excavation as outlined above.

CH2M-Jones Response

The three monitor wells referenced in this comment (E605GW004, E605GW005, and E605GW006) were abandoned. Monitor well E605GW006 was abandoned prior to the IM because of its location within the excavation boundary. Monitor wells E605GW004 and E605GW005 were damaged during the IM and were subsequently abandoned. All three wells were proposed for replacement. They were replaced in February 2003. The construction and boring logs are presented in Appendix D of the attached RFI Report Addendum.

As requested additional groundwater samples were collected from monitor wells E605GW004 and E605GW005 prior to soil removal activities; and the replacement monitor wells for E605GW004, E605GW005, and E605GW006 (E605GW04R, E605GW05R, and E605GW06R) were sampled following the completion of the IM at SWMU 5. The results from these samples are discussed in the attached RFI Report Addendum.

Responses to Hydrogeology Comments (Jo Cherie Overcash, 28 June 2002)

**Phase II Interim Measure Work Plan Addendum, dated June 2002:
SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E
Charleston Naval Complex, SC**

For clarification, the author contacted Mr. Jim Edens of CH2M-Hill regarding the response referencing monitoring well E605GW005 as it was the location of monitoring well E605GW004 that was the topic of the author's original comment (Overcash to Rennhack, 5/23/02). In the May 2002 Memorandum from Overcash to Rennhack, The Division of Hydrogeology stated that "...the Navy must collect a minimum of two additional groundwater samples from monitoring wells E605GW004 and E605GW005. The first sample should be collected immediately from each well and the second sample should be collected within three months of completion of contaminated soil excavation." It is now understood that monitoring well E605GW005 may actually be located in the southern target excavation area. The Division of Hydrology maintains that a groundwater sample must be collected from E605GW004 and E605GW005 prior to soil excavation. Also, the decision whether to preserve or abandon E605GW004 will be based on the analytical results of the two proposed intermediate interval soil samples from the southern excavation area. An attempt to preserve E605GW005 will be made if the excavation depth is near 1 foot or less. If the excavation depth increases beyond 1 foot, E605GW005 will be abandoned prior to soil excavation. The need to replace this well will be made upon review of the entire data set.

CH2M-Jones Response

Both of the above referenced monitor wells were abandoned following the completion of the IM at SWMU 5. The wells were replaced and sampled in accordance with the SCDHEC comments on the Phase II IM WP (see previous response to comment, above).

Also discussed with Mr. Edens, is the concern that the CH2MHill boring logs included in Appendix C of the Phase II Interim Measure Workplan, dated April 2002, for the installation of monitoring wells E605GW005, E605GW006, E605GW007 and E605GW008 do not include the surveyed coordinates (location) of these installations. This requirement was clearly stated on Monitoring Well Approval HW-01-091 granted by the Department on 20 November 2001. While this data may be available to the Navy and the Department through the Navy's Geographic

Information System (GIS), the coordinates for all monitoring wells must be included on the boring logs when submitted. See Section H.1.f.(2) of the R.61-71 South Carolina Well Standards for clarification.

CH2M-Jones Response

The coordinates for monitor wells E605GW005, E605GW006, E605GW007 and E605GW008 have been added to the well construction logs and are attached.

Responses to Hydrogeology Comments (Jo Cherie Overcash, 14 October 2002)

Phase II Interim Measure Work Plan Addendum 2, dated October 2002: Soil Removal

SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E

Charleston Naval Complex, SC

As you will recall, there has been discussion with Mr. Jim Edens of CH2M-Hill regarding the locations of monitoring wells E605GW004 and E605GW005 with regard to the proposed excavation areas (Overcash to Stamps, 6/27/02). Workplan Addendum 2 Figure 2-1 entitled Revised Proposed Excavation Areas depicts excavation areas that should not directly impact monitoring well E605GW004; however, monitoring well E605GW005 appears to be located on the edge of the southern target excavation area. The excavation activities proposed in this vicinity are for removal of surface soil from 0 - 1 foot below land surface (bls). Therefore, the Navy should take precaution to preserve the integrity of monitoring well E605GW005 during these field activities.

The integrity of monitoring well E605GW001 should be maintained during the proposed soil excavation activities at the E018SB004 location. The Navy has proposed to excavate soils to an intermediate depth of 1 - 3 feet bls at that location.

In conclusion, as stated in the Conditional Approval for the Phase II Interim Measure Workplan (Scaturo to Daniell, 5/3/102) the Navy must collect a minimum of two additional groundwater samples from monitoring wells E605GW004 and E605GW005. A sample must be collected prior to the soils excavation activities and a sample must be collected within three months of completion of the soil removal activities. These additional groundwater data will aid in making a decision regarding groundwater corrective measures at these units.

CH2M-Jones Response

Both of the above referenced monitor wells were abandoned following the completion of the IM at SWMU 5. The wells were replaced and sampled in accordance with the SCDHEC comments on the Phase II IM WP (see earlier response to comment, above).



Well Number: E605GW005

Sheet: 1 of 1

Client: Navy
Project: CNC
Location: North Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/15,2001

Depth (ft)	Sample Info		Soil Log	Soil Description	Elev - Depth	Well Drawing	Well Construction Notes
	Sample #	SPT (6"-6"-6")					
0				Ground Surface	8.1		
				Asphalt	0.0		Top of casing elevation = 8.14 ft msl
				Dark brown medium sand w/ ROC, dry	7.3		2 inch diameter PVC well casing
				Light brown medium sand w/ ROC, dry	0.8		Grout (portland cement plus 5% bentonite)
							Bentonite
					5.1		Top of screen 2.5 ft bls
				Orange fine to medium sand, dry	3.0		
					4.1		
				Brown fine to medium slightly clayey sand, saturated at 5 ft	4.0		20/30 silica sand
					2.1		Water level = 5.23 ft below TOC (2.91 ft msl, 12/5/01)
				Olive gray fine clayey sand, saturated	6.0		2 inch diameter PVC 0.010 slotted well screen
10							
					-4.9		
				End of Log	13.0		
15							
20							

Well Location
N 373414.8
E 2320660.6



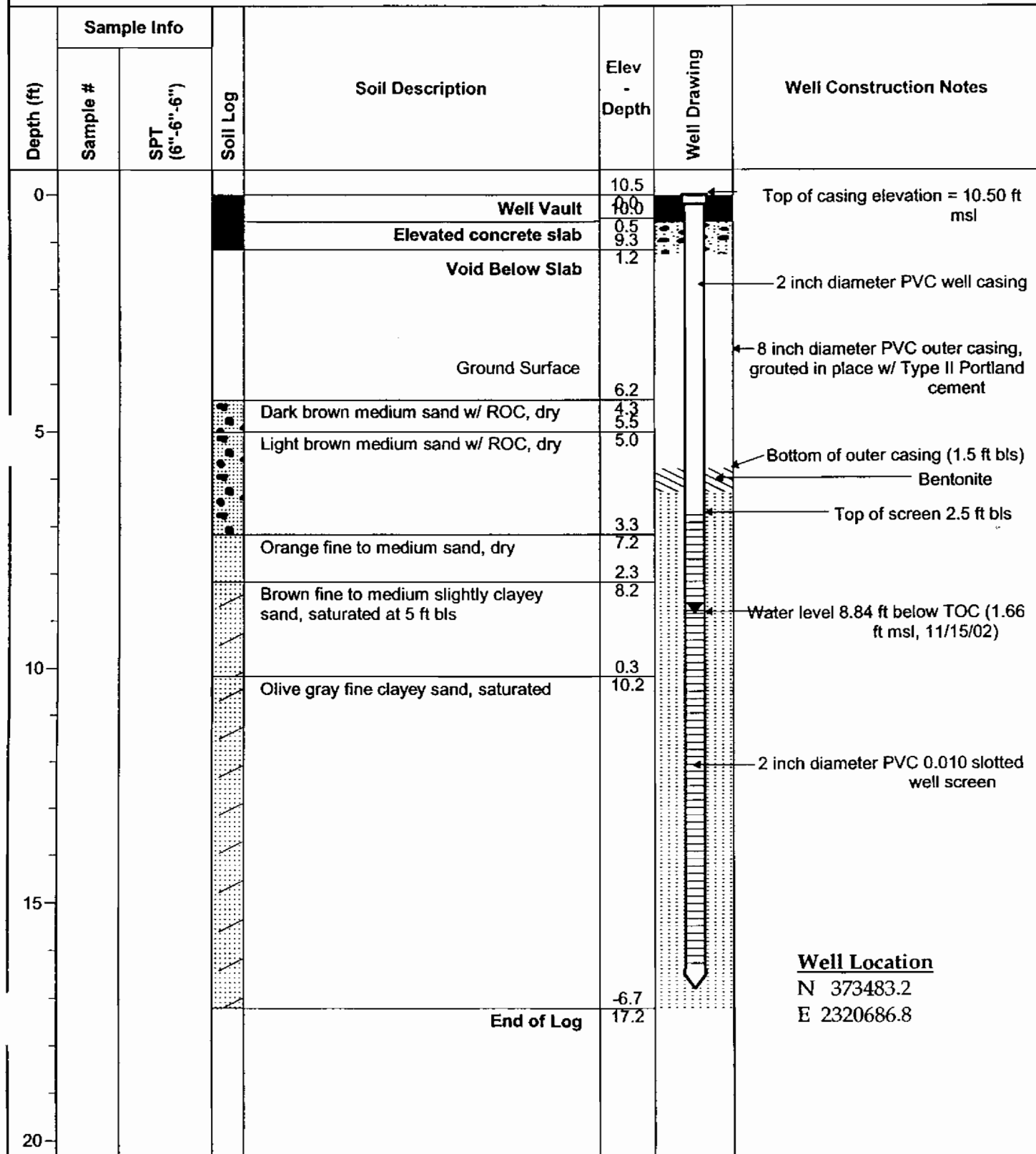
CH2MHILL

Well Number: E605GW006

Sheet: 1 of 1

Client: Navy
Project: CNC
Location: Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/15,2001



**CH2MHILL****Well Number: E605GW007**

Sheet: 1 of 1

Client: Navy
Project: CNC
Location: North Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/28,2001

Depth (ft)	Sample Info		Soil Log	Soil Description	Elev - Depth	Well Drawing	Well Construction Notes
	Sample #	SPT (6"-6"-6")					
0				Ground Surface	9.5		
				Dark brown medium sand w/ ROC, dry	0.0		Top of casing elevation = 9.51 ft msl
					8.7		2 inch diameter PVC well casing
				Light brown medium sand w/ ROC, dry	0.8		Grout (portland cement plus 5% bentonite)
							Bentonite
					6.5		Top of screen 2.0 ft bls
				Orange fine to medium sand, dry	3.0		
					5.5		
				Brown fine to medium slightly clayey sand, saturated at 5 ft	4.0		20/30 silica sand
5					3.5		
				Olive gray fine clayey sand, saturated	6.0		
							Water level=7.02 ft below TOC (2.49 ft msl, 4/17/02)
							2 inch diameter PVC 0.010 slotted well screen
10							
					-3.5		
				End of Log	13.0		
15							
							<u>Well Location</u> N 373560.6 E 2320717.4
20							




CH2MHILL

Well Number: E605GW008

Sheet: 1 of 1

Client: Navy
Project: CNC
Location: North Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/28,2001

Depth (ft)	Sample Info		Soil Log	Soil Description	Elev - Depth	Well Drawing	Well Construction Notes
	Sample #	SPT (6" - 6" - 6")					
0				Ground Surface	8.0		Top of casing elevation = 8.02 ft msl 2 inch diameter PVC well casing Grout (portland cement plus 5% bentonite) Bentonite Water level=1.96 ft below TOC (6.06 ft msl, 4/17/02) Top of screen 2.0 ft bls 20/30 silica sand 2 inch diameter PVC 0.010 slotted well screen
				Dark brown medium sand w/ ROC, dry	0.0		
				Light brown medium sand w/ ROC, dry	7.2		
					0.8		
				Orange fine to medium sand, dry	5.0		
					3.0		
				Brown fine to medium slightly clayey sand, saturated at 5 ft	4.0		
					4.0		
5				Olive gray fine clayey sand, saturated	2.0		
					6.0		
10							
				End of Log	-5.0		Well Location N 373500.9 E 2320659.2
					13.0		
15							
20							



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

**SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003**

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address : TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: _____

Truck # _____

Date: _____

Driver Signature: _____

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: RES/CONCRETE, WOOD DEBRIS

Ticket Number: 206291

Tonnage: 2096

Received by: Incarter

Date: 11/12/02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

**SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003**

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address: TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: Cannon

Truck # 110

Date: 02/01/11

Driver Signature: Randy Wilson

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: RES/CONCRETE, WOOD DEBRIS

Ticket Number: 205603

Tonnage: 9.22

Received by: G. K. Kase

Date: 11.1.02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

**SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003**

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address: TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: _____

Truck # 25

Date: _____

Driver Signature:

Maurice Barker

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: RES/CONCRETE, WOOD DEBRIS

Ticket Number:

205538

Tonnage:

1089

Received by:

W Carter

Date:

10/31/02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address : TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: _____

Truck #

110

Date: 02/23/00

Driver Signature: _____

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site:

SOL Oakridge Landfill DWP 130

Description of Waste:

RES/CONCRETE, WOOD DEBRIS

Ticket Number:

204323

Tonnage:

8.81

Received by:

noarter

Date:

10/23/02

**OAKRIDGE LANDFIL**

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address : TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: Cannon

Truck # 04

Date: 10-23-02

Driver Signature: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: RES/CONCRETE, WOOD DEBRIS

Ticket Number: 204281

Tonnage: ~~15.42~~ 15.42

Received by: noater

Date: 10/23/02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address : TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: Cannon

Truck # 110

Date: 10/23/02

Driver Signature: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site:

Oakridge Landfill DWP 130

Description of Waste:

RES/CONCRETE, WOOD DEBRIS

Ticket Number: 20485

Tonnage: 1724

Received by: UNDAUER

Date: 10/23/02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0210012
EXPIRATION 10/15/2003

Generator: CH2MHILL/JONES

Account Number: 490-291

Location / Address : TRUXTRON AVE

N CHARLESTON SC (10)

Tele Number: 843-514-4761

Contact: RICHARD GARCIA

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: Cannon Truck # 27

Date: 10/18/02

Driver Signature: James J. Cannon

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: RES/CONCRETE, WOOD DEBRIS

Ticket Number: 2431061 2036087

Tonnage: 5.02

Received by: W. Carter

Date: 10/18/02



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address SOUTHERN DIV. NAVAL FACILITY ENV# COM

PO BOX 190010 (C-50)
N. CHARLESTON SC 29419-9010

RICK NIELSON
(843) 743-2985

4. Generator's Phone (843) 740-2780

JED HEAMES

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.
2050 CENTRAL AVENUE, S.E.
CANTON OH 44707

10. U.S. EPA ID Number

DHD980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

a. RQ Hazardous waste, solid, n.o.s. (Lead)
9, NA3077, PG III
(D008) ASH 82-6966 ENV#CS4671

12. Containers
No. Type

0.01

DT

13. Total Quantity

461.00

14. Unit
Wt/Vol

P

D008

456.80

Additional Descriptions of Materials Listed Above

a.
b.
c.
d.

15. Special Handling Instructions and Additional Information

"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."

Public reporting burden for this collection of information is estimated to
average: 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

01/06/03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

LESTER PORTER

Signature

Lester Porter

Month Day Year

10/10/03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator, Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For *each* waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Command Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 CSO

Manifest Document Number: 13828 State Manifest Document Number:

Section 1 Manifest Item #	Section 2 Envirite Approval #	Section 3 EPA Hazardous Waste Number ("Waste Code")	Section 4 Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Section 5 Subcategory (if applicable)	Section 6 Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Section 7 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 8 To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard A. Nielson Signature: [Signature] Date: 1/6/03

Section 9 I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

Section 10 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

Section 11 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

SCD170022560

Manifest
Document No.

13829

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

PO BOX 190010

SOUTHERN DIV. NAVAL FACILITY ENG. COM.

N. CHARLESTON SC 29419-9010

RICK NIELSON

4. Generator's Phone (843) 740-2780

JED HEARNES

(843) 743-2985

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

DHD980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

a. RQ Hazardous waste, solid, n.o.s. (Lead)

9, NA3077, PG III

(D008) ASH 82-6956 ENV#CS4671

12. Containers
No. Type

001 DT

13. Total Quantity

46000 P

14. Unit
Wt/Vol

0008

41500

Additional Description of Materials Listed Above

a. _____

c. _____

b. _____

d. _____

15. Special Handling Instructions and Additional Information

"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."

Public reporting burden for this collection of information is estimated to
average 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment. OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

10/10/2013

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Deborah Banks

Signature

Deborah Banks

Month Day Year

10/10/2013

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. _____ lbs. c. _____ lbs.

b. _____ lbs. d. _____ lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste reference herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Bq Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 CSO

Manifest Document Number: 13829

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
<u>11a</u>	<u>CS4671</u>	<u>D008</u>	<u>NWW</u>		See section <u>9</u>
					See section
					See section
					See section

Section 3: Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 4: To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard G. Nielson Signature: [Signature] Date: 11/6/03

Section 5: I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

Section 6: I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

Section 7: I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

SCD170022560

Manifest
Document No.

13830

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

SOUTHERN DIV. NAVAL FACILITY

PO BOX 190010 (C50)

N. CHARLESTON SC 29419-9010

RICK NIELSON

(843) 743-2985

4. Generator's Phone (843) 740-2780

JED HEAMES

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

OH D 980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. RG Hazardous waste, solid, n.o.s. (Lead)
9, NA3077, PG III
(D008) ASH 82-6966 ENV#CS4671

001 DP

4600

P

D008

b.

c.

d.

40620

a. -----
b. -----

c. -----
d. -----

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

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PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
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health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD C. NIELSON

Signature

Richard C. Nielson

Month Day Year

01/06/03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

JACK HOLMES

Signature

Jack Holmes

Month Day Year

01/06/03

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For *each* waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Section 1

Generator's Name: Southern Div. Naval Facility Eng Generator's EPA #: SC 0170 022560
 Pick-up Address: PO Box 190010 (CSO)
 Manifest Document Number: 13830 State Manifest Document Number: _____

SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4671	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Section 8

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 9

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: RICHARD G. NIERSON Signature: [Signature] Date: 10/06/03

Section 10

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

Section 11

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

Section 12

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

FORM HAZARDOUS WASTE MANIFEST	1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is by State law.
	5 C 0 1 7 0 0 2 2 5 6 0	1 3 8 3 1		

3. Generator's Name and Mailing Address SOUTHERN DIV. NAVAL FACILITY PO BOX 190010 CSO N. CHARLESTON SC 29419-9010		A. State of South Carolina B. State of Georgia C. State of Florida D. State of Alabama E. State of Mississippi F. State of Louisiana G. State of Texas H. State of Arkansas I. State of Missouri J. State of Illinois K. State of Indiana L. State of Ohio M. State of Pennsylvania N. State of New York O. State of Maryland P. State of Delaware Q. State of New Jersey R. State of Connecticut S. State of Rhode Island T. State of Massachusetts U. State of Vermont V. State of New Hampshire W. State of Maine X. State of New Brunswick Y. State of Nova Scotia Z. State of Prince Edward Island AA. State of Newfoundland AB. State of Quebec AC. State of Ontario AD. State of Manitoba AE. State of Saskatchewan AF. State of Alberta AG. State of British Columbia AH. State of Yukon AI. State of Northwest Territories AJ. State of Nunavut
4. Generator's Phone (843) 740-2780	JED HEAMES	
5. Transporter 1 Company Name ROBBIE D. WOOD	6. U.S. EPA ID Number A L D 0 6 7 1 3 8 8 9 1	
7. Transporter 2 Company Name	8. U.S. EPA ID Number	
9. Designated Facility Name and Site Address ENVIRITE OF OHIO, INC. 2050 CENTRAL AVENUE, S.E. CANTON OH 44707	10. U.S. EPA ID Number O H D 9 8 0 5 6 8 9 9 2	

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No. Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ Hazardous waste, solid, n.o.s. (Lead) 9, NA3077, PG III (D008) ASH 82-6966 ENV#CS4671	0 0 1 BT	46 000	P
b.		3,886.0	
c.			
d.			

a. _____	c. _____
b. _____	d. _____

15. Special Handling Instructions and Additional Information "EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR NIGHT TO 1-800-ASHLAND."	Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M. St., S.W., Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment. OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.	

Printed/Typed Name RICHARD G. NIELSON	Signature <i>Richard G. Nielson</i>	Month Day Year 10 1 06 10 3
---	--	---------------------------------------

17. Transporter 1 Acknowledgement of Receipt of Materials		
Printed/Typed Name LORENZO BRUNN	Signature <i>Lorenzo Brunn</i>	Month Day Year 10 1 06 10 3

18. Transporter 2 Acknowledgement of Receipt of Materials		
Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space			
a.	_____	lbs. c.	_____
b.	_____	lbs. d.	_____

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.			
Printed/Typed Name	Signature	Month Day Year	

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/or if..,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng. Generator's EPA #: SC0170022560

Pick-up Address: PO Box 190010 (C-50)

Manifest Document Number: 13831

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

SECTION 2

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 3

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard C. Nelson Signature: [Signature] Date: 1/6/03

SECTION 4

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

SECTION 5

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

SECTION 6

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

SCD170022560

Manifest
Document No.

13832

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

PO BOX 190010 CSO
N. CHARLESTON SC 29419-9010

SOUTHERN DIV. NAVAL FACILITY ENG. COM.

RICK NIELSON
(843) 743-2985

4. Generator's Phone

843 740-2780

JED HEAMES

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.
2050 CENTRAL AVENUE, S.E.
CANTON OH 44707

10. U.S. EPA ID Number

PHD980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

RG Hazardous waste, solid, n.o.s. (Lead)
9, HA3077, PG III
(D008) ASH 82-6966 ENV#CS4671

12. Containers
No. Type

001 DT

13. Total Quantity

46000

14. Unit
Wt/Vol

P

0008

45500

Additional Description of Materials Listed Above

Handling Code for Wastes Listed Above

a.
b.

c.
d.

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to
average: 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

10 1 06 03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

OLEND HARRIS

Signature

Olend Harris

Month Day Year

10 1 06 03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste reference herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if..,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Command Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 CSO

Manifest Document Number: 13832

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
<u>11a</u>	<u>CS4671</u>	<u>D008</u>	<u>NWW</u>		See section <u>9</u>
					See section
					See section
					See section

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard G. Nickerson

Signature: [Signature]

Date: 1/6/03

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name:

Signature:

Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address **SOUTHERN DIV. NAVAL FACILITY**

PO BOX 190010 C50

N. CHARLESTON SC 29419-9010

4. Generator's Phone (**843**) **740-2780**

JED HEANES

5. Transporter 1 Company Name

6. U.S. EPA ID Number

ROBBIE D. WOOD

IA 1 D 0 6 1 7 1 3 8 8 9 1 1

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

10. U.S. EPA ID Number

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

OH D 9 8 0 5 6 8 9 9 2 1

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. **RD Hazardous waste, solid, n.o.s. (Lead)**

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

0 0 1 DT

46.000 P

D 0 0 8

b.

c.

d.

39.140

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to
average 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment, OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSEN

Signature

Richard G. Nielsen

Month Day Year

10/10/03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

M. Farnsworth

Signature

M. Farnsworth

Month Day Year

10/10/03

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

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is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Generator's EPA #: SC 0170 022560

Pick-up Address: PO Box 190010 (CSO)

Manifest Document Number: 13833

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
<u>11a</u>	<u>CS4671</u>	<u>D008</u>	<u>NWW</u>		See section <u>9</u>
					See section
					See section
					See section

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard G. Nelson Signature: [Signature] Date: 1/16/03

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name:

Signature:

Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:

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Printed Name:

Signature:

Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

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Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is by State law.
	SC0170022560	13834		

3. Generator's Name and Mailing Address **SOUTHERN DIV. NAVAL FACILITY ENG. COM.**

PO BOX 190010

N. CHARLESTON SC 29419-9010

4. Generator's Phone (843) 740-2780

JED HEAMES

**RICK NELSON
(843) 745-2985**

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

AD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

PHD980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. **RQ Hazardous waste, solid, n.c.s. (Lead)**

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

001 DT

46000 P

D008

b.

37620

c.

15. Special Handling Instructions and Additional Information

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suggestions for reducing this burden, to Chief, Information Policy Branch,
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If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NELSON

Signature

Richard G. Nelson

Month Day Year

01/06/03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Robbie D. Wood

Signature

Robbie D. Wood

Month Day Year

01/06/03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For *each* waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Command **Generator's EPA #:** SC 0170 022560

Pick-up Address: PO Box 190010 CSO

Manifest Document Number: 13834 **State Manifest Document Number:** _____

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Section 6: Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 7: To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard G. Nielson **Signature:** [Signature] **Date:** x

Section 8: I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: _____ **Signature:** _____ **Date:** _____

Section 9: I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ **Signature:** _____ **Date:** _____

Section 10: I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ **Signature:** _____ **Date:** _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is by State law.
3. Generator's Name and Mailing Address PO BOX 190010 CSO N. CHARLESTON SC 29419-9010		SOUTHERN DIV. NAVAL FACILITY ENG. COM. RICK NIELSON (843) 743-2780 JED HEAMES (843) 743-2985			
4. Generator's Phone (843) 740-2780		5. Transporter 1 Company Name ROBBIE D. WOOD		6. U.S. EPA ID Number A1D067138891	
7. Transporter 2 Company Name		8. U.S. EPA ID Number			
9. Designated Facility Name and Site Address ENVIRITE OF OHIO, INC. 2050 CENTRAL AVENUE, S.E. CANTON OH 44707		10. U.S. EPA ID Number 08D980568992			
11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ Hazardous waste, solid, n.o.s. (Lead) 9, HA3077, PG III (D008) ASH 82-6966 ENV#CS4671		001	DT	460.00	P
b.				48740	
c.					
Additional Descriptions (if other than above)		Additional Descriptions (if other than above)			
a. _____		c. _____			
b. _____		d. _____			
15. Special Handling Instructions and Additional Information "EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR NIGHT TO 1-800-ASHLAND."		Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.			
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.		Printed/Typed Name RICHARD G. NIELSON			
Signature <i>Richard G. Nielson</i>		Month Day Year 01/07/03			
17. Transporter 1 Acknowledgement of Receipt of Materials		Printed/Typed Name Michael D. Gibbons			
Signature <i>Michael D. Gibbons</i>		Month Day Year 01/07/03			
18. Transporter 2 Acknowledgement of Receipt of Materials		Printed/Typed Name			
Signature		Month Day Year			
19. Discrepancy Indication Space		a. _____ lbs. c. _____ lbs. b. _____ lbs. d. _____ lbs.			
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.		Printed/Typed Name			
Signature		Month Day Year			

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste reference herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For *each* waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if..,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng. Generator's EPA #: SC 0170 022560

Pick-up Address: PO Box 190010 (CSO)

Manifest Document Number: 13835

State Manifest Document Number:

SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

SECTION 7

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 8

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: RICHARD G. NIELSON Signature: Richard G. Nielson Date: 1/7/03

SECTION 9

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

SECTION 10

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

SECTION 11

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

SOUTHERN DIV. NAVAL FACILITY ENG. COM.

PO BOX 190010 C 30

N. CHARLESTON SC 29419-9010

RICK NIELSON

4. Generator's Phone () 843 740-2780

JED HEAMES (843) 743-2985

5. Transporter 1 Company Name

6. U.S. EPA ID Number

ROBBIE D. WOOD

ALD 067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

10. U.S. EPA ID Number

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

DHD 980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. RO Hazardous waste, solid, n.o.s. (Lead)
9, HA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

001

DT

46000

P

D 0 0 8

b.

48000

c.

d.

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to
average 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

01 07 03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if...,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Engineering Command Generator's EPA #: SC 0170 022560
Pick-up Address: Po Box 190010 (CSO)
Manifest Document Number: 13836 State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: RICHARD G. NELSON Signature: [Signature] Date: 7/17/03

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

Form HAZARDOUS WASTE MANIFEST	1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1
	SC0170022560	13837	Information in the shaded areas is not required by Federal law, but is by State law.

3. Generator's Name and Mailing Address	SOUTHERN DIV. NAVAL FACILITY ENG. COM. PO BOX 190010 CSO N. CHARLESTON SC 29419-9010
4. Generator's Phone	843 740-2780 JED HEAKES (843) 743-2985
5. Transporter 1 Company Name	ROBBIE D. WOOD
6. U.S. EPA ID Number	ALD067138891
7. Transporter 2 Company Name	
8. U.S. EPA ID Number	
9. Designated Facility Name and Site Address	ENVIRITE OF OHIO, INC. 2050 CENTRAL AVENUE, S.E. CANTON OH 44707
10. U.S. EPA ID Number	OH0980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. RG Hazardous waste, solid, n.o.s. (Lead) 9, HA3077, PG III (D008) ASH 82-6966 ENV#CS4671	0.01	DT	46.000	P
b.			433.20	
c.				

a.	b.	c.	d.
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15. Special Handling Instructions and Additional Information	Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.
"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR NIGHT TO 1-800-ASHLAND."	

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.
--

Printed/Typed Name RICHARD G NIELSON	Signature <i>Richard G. Nielson</i>	Month Day Year 10 1 07 03
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17. Transporter 1 Acknowledgement of Receipt of Materials	Printed/Typed Name C. W. R. Rogers	Signature <i>C. W. R. Rogers</i>	Month Day Year 10 1 07 03
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18. Transporter 2 Acknowledgement of Receipt of Materials	Printed/Typed Name	Signature	Month Day Year
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19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
--

Printed/Typed Name	Signature	Month Day Year
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LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste reference herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Command Generator's EPA #: SC 0170 022560

Pick-up Address: PO Box 190010 (CSO)

Manifest Document Number: 13837

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
<u>11a</u>	<u>CS4671</u>	<u>D008</u>	<u>NWW</u>		See section <u>9</u>
					See section
					See section
					See section

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: x RICHARD G. NIELSON Signature: x Richard G. Nielson Date: x 1/7/03

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove a hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

SOUTHERN DIV. NAVAL FACILITY ENG C/Jm

PO BOX 190010 CSO

N. CHARLESTON SC 29419-9010

RICK NIELSON

4. Generator's Phone (843) 740-2780

JED HEAMES (843) 743-2985

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

DHD980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. RO Hazardous waste, solid, n.o.s. (Lead)

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

001 DT

10.00

P

D008

b.

c.

d.

447.00

a. _____

c. _____

b. _____

d. _____

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to
average: 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

10 10 7 03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Robbie D. Wood

Signature

Robbie D. Wood

Month Day Year

10 10 7 03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. _____ lbs. c. _____ lbs.

b. _____ lbs. d. _____ lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste reference herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Command **Generator's EPA #:** SC 0170 022560

Pick-up Address: Po Box 190010 (CSO)

Manifest Document Number: 13838 **State Manifest Document Number:** _____

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Section 8 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 9 To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.
Printed Name: RICHARD G. NIERSON **Signature:** [Signature] **Date:** 1/7/03

Section 10 I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.
Printed Name: _____ **Signature:** _____ **Date:** _____

Section 11 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
Printed Name: _____ **Signature:** _____ **Date:** _____

Section 12 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
Printed Name: _____ **Signature:** _____ **Date:** _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is by State law.
	SCD170022560	13839		

3. Generator's Name and Mailing Address	SOUTHERN DIV. NAVAL FACILITY ENG. COM. PO BOX 190010 CSO N. CHARLESTON SC 29419-9010	RICK NIELSON
4. Generator's Phone	(843) 740-2780	JED HEAMES (843) 743-2985

5. Transporter 1 Company Name	ROBBIE D. WOOD	6. U.S. EPA ID Number	ALD0671380911
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7. Transporter 2 Company Name		8. U.S. EPA ID Number	
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9. Designated Facility Name and Site Address	ENVIRITE OF OHIO, INC. 2050 CENTRAL AVENUE, S.E. CANTON OH 44707	10. U.S. EPA ID Number	OH D980568992
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11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No. Type	13. Total Quantity	14. Unit Wt/Vol	<table border="1"><tr><td>D</td><td>0</td><td>0</td><td>8</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	D	0	0	8																
D	0	0	8																					
a. RG Hazardous waste, solid, n.o.s. (Lead) 9, NA3077, PG III (D008) ASH 82-6966 ENV#CS4671	001 BT	46000	P																					
b.		47780																						
c.																								
d.																								

Additional Description	Additional Information																																								
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15. Special Handling Instructions and Additional Information	Public reporting burden for this collection of information is estimated to average 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.
EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR NIGHT TO 1-800-ASHLAND.	

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.
--

Printed/Typed Name RICHARD G. NIELSON	Signature <i>Richard G. Nielson</i>	Month Day Year 01 07 03
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17. Transporter 1 Acknowledgement of Receipt of Materials		
Printed/Typed Name <i>Robbie D. Wood</i>	Signature <i>Robbie D. Wood</i>	Month Day Year 11 17 03

18. Transporter 2 Acknowledgement of Receipt of Materials		
Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space																																								
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20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.		
Printed/Typed Name	Signature	Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For *each* waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if.,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng. Command Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 (CSO)

Manifest Document Number: 13839

State Manifest Document Number:

SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4671	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

SECTION 7

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 9

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: x RICHARD G. NIELSON Signature: x Richard G. Nielson Date: 4/7/03

SECTION 10

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name:

Signature:

Date:

SECTION 11

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:

SECTION 12

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

SOUTHERN DIV. NAVAL FACILITY ENG. COM

PO BOX 190010 CSO

N. CHARLESTON SC 29419-9010

RICK NIELSON

4. Generator's Phone (843) 740-2780

JED HEAMES (843) 743-2985

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

PHD980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. RQ Hazardous waste, solid, n.o.s. (Lead)
9, NA3077, PG III
(D008) ASH 82-6966 ENV#CS4671

001 DT

46000 P

0008

45380

a. _____
b. _____

c. _____
d. _____

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to
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minutes for treatment storage and disposal facilities. This includes time
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the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
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the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

01 07 03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

DOE M. RUSSELL

Signature

DOE M. Russell

Month Day Year

01 07 03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. _____ lbs. c. _____ lbs.

b. _____ lbs. d. _____ lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

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If the waste ...,	and/but if..,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 (CSO)

Manifest Document Number: 13840

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS467	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

SECTION 2

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 3

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: RICHARD G. NIBESON Signature: [Signature] Date: 1/7/03

SECTION 4

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name:

Signature:

Date:

SECTION 5

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:

SECTION 6

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

FORM HAZARDOUS WASTE MANIFEST	1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is by State law.
	SCD170022560	13841		

3. Generator's Name and Mailing Address SOUTHERN DIV. NAVAL FACILITY ENG COM PO BOX 190010 CSO N. CHARLESTON SC 29419-9010		RIEK NIELSON
4. Generator's Phone	(843) 740-2780	JED HEAMES (843) 743-2985
5. Transporter 1 Company Name	ROBBIE D. WOOD	6. U.S. EPA ID Number A1D067138891
7. Transporter 2 Company Name		8. U.S. EPA ID Number
9. Designated Facility Name and Site Address ENVIRITE OF OHIO, INC. 2050 CENTRAL AVENUE, S.E. CANTON OH 44707	10. U.S. EPA ID Number DHD980568992	

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No. Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ Hazardous waste, solid, n.o.s. (Lead) 9, NA3077, PG III (D008) ASH 82-6966 ENV#CS4671	001 BT	46000 P	D008
b.		49200	
c.			

a.	b.	c.	d.

15. Special Handling Instructions and Additional Information

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If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name RICHARD G. NIELSON	Signature <i>Richard G. Nielson</i>	Month Day Year 10 10 7 03
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17. Transporter 1 Acknowledgement of Receipt of Materials		
Printed/Typed Name <i>Robbie D. Wood</i>	Signature <i>Robbie D. Wood</i>	Month Day Year 10 10 7 03

18. Transporter 2 Acknowledgement of Receipt of Materials		
Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space

a.	b.	c.	d.

20. Facility Owner or Operator, Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.		
Printed/Typed Name	Signature	Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

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is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Center Generator's EPA #: SC 0170 022560
 Pick-up Address: PO Box 190010 (CSO)
 Manifest Document Number: 13841 State Manifest Document Number: _____

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS467	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: RICHARD A. NELSON Signature: [Signature] Date: 7/24/98

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

5 C 0 1 7 0 0 2 2 5 6 0 1 3 8 4 2

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

SOUTHERN DIV. NAVAL FACILITY ENG. COM.

PO BOX 190010

CSO

N. CHARLESTON SC 29419-9010

RICK NIELSON

4. Generator's Phone (

843) 740-2780

JED HEAMES

(843) 743-2955

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

IA L D 0 6 7 1 3 8 8 9 1

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

O H D 9 8 0 5 6 8 9 9 2

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

a. RQ Hazardous waste, solid, n.o.s. (Lead)

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

12. Containers
No. Type

0 0 1 D T

13. Total Quantity

4 6 0 0 0 P

14. Unit
Wt/Vol

0 0 0 8

b.

c.

d.

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to
average: 37 minutes for generators, 15 minutes for transporters, and 10
minutes for treatment storage and disposal facilities. This includes time
for reviewing instructions, gathering data, and completing and reviewing
the form. Send comments regarding the burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified,
packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and
the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically
practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

0 1 0 7 0 3

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Robbie D. Wood

Signature

Robbie D. Wood

Month Day Year

10 1 0 7 0 3

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste reference herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if...,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng. Command Generator's EPA #: SC 0170 022560

Pick-up Address: PO Box 190010 (CSO)

Manifest Document Number: 13842

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
<u>11a</u>	<u>CS4671</u>	<u>D008</u>	<u>NWW</u>		See section <u>9</u>
					See section
					See section
					See section

SECTION 2 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 3 To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: RICHARD G. NORTON Signature: [Signature] Date: 1/7/03

SECTION 4 I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

SECTION 5 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

SECTION 6 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST 1. Generator's U.S. EPA ID No. **SCD17100225610** Manifest Document No. **13843** 2. Page 1 of 1 Information in the shaded areas is not required by Federal law, but is by State law.

3. Generator's Name and Mailing Address **SOUTHERN DIV. NAVAL FACILITY ENG CORP**

**PO BOX 190010 CSO
N. CHARLESTON SC 29419-9010**

4. Generator's Phone (**843**) **740-2780**

JED HEAMES (843) 743-2385

5. Transporter 1 Company Name

6. U.S. EPA ID Number

ROBBIE D. WOOD

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

10. U.S. EPA ID Number

**ENVIRITE OF OHIO, INC.
2050 CENTRAL AVENUE, S.E.
CANTON OH 44707**

OH D 980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. **RQ Hazardous waste, solid, n.o.s. (Lead)**

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

0.01

BT

460.00

P

D008

b.

c.

d.

3.8000

a.

c.

b.

d.

15. Special Handling Instructions and Additional Information

**"EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND
DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
NIGHT TO 1-800-ASHLAND."**

Public reporting burden for this collection of information is estimated to average 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M. St., S.W., Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name

RICHARD C. NELSON

Signature

Richard C. Nelson

Month Day Year

9/27/03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

ROBBIE D. WOOD

Robbie D. Wood

9/27/03

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For each waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/but if...,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng. Support Command Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 (CSO)

Manifest Document Number: 13843 State Manifest Document Number: _____

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
<u>11a</u>	<u>CS4671</u>	<u>D008</u>	<u>NWW</u>		See section <u>9</u>
					See section
					See section
					See section

SECTION 2 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 3 To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: x RICHARD C. NIELSEN Signature: x Richard C. Nielsen Date: x 1/7/03

SECTION 4 I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

SECTION 5 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____

SECTION 6 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ Signature: _____ Date: _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST 1. Generator's U.S. EPA ID No. SCD170022560 Manifest Document No. 13844 2. Page 1 of 1 Information in the shaded areas is not required by Federal law, but is by State law.

3. Generator's Name and Mailing Address SOUTHERN DIV. NAVAL FACILITY ENS COM

PO BOX 190010

N. CHARLESTON SC 29419-9010

4. Generator's Phone (843) 740-2780

JED HEARNES (843) 743-2985

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

AJD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.
2050 CENTRAL AVENUE, S.E.
CANTON OH 44707

10. U.S. EPA ID Number

OH0980568992

11. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)

a. RQ Hazardous waste, solid, n.o.s. (Lead)

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

12. Containers
No. Type

001 BT

13. Total Quantity

46000 P

14. Unit
Wt/Vol

D008

45060

Additional U.S. DOT Hazardous Waste Codes

a. - - - - -

c. - - - - -

b. - - - - -

d. - - - - -

15. Special Handling Instructions and Additional Information

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16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name

RICHARD G. WILSON

Signature

[Signature]

Month Day Year

01 07 03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Mr. E. Schaeferberg

Signature

[Signature]

Month Day Year

01 07 03

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

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If the waste ...,	and/but if..,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Support **Generator's EPA #:** SC 0170 022560

Pick-up Address: PO Box 190010 (CSO)

Manifest Document Number: 13844 **State Manifest Document Number:** _____

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4677	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Section 8 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 9 To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard G. Nielson **Signature:** [Signature] **Date:** 1/7/03

Section 10 I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: _____ **Signature:** _____ **Date:** _____

Section 11 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ **Signature:** _____ **Date:** _____

Section 12 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: _____ **Signature:** _____ **Date:** _____



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST 1. Generator's U.S. EPA ID No. SCD170022560 2. Page 1 of 1 Manifest Document No. 13845 Information in the shaded areas is not required by Federal law, but is by State law.

3. Generator's Name and Mailing Address SOUTHERN DIV. NAVAL FACILITY ENG COM

PO BOX 190010
N. CHARLESTON SC 29419-9010

4. Generator's Phone (843) 1740-2780

JED HEANES (843) 743-2985

5. Transporter 1 Company Name

6. U.S. EPA ID Number

ROBBIE D. WOOD

ALD0671888911

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

10. U.S. EPA ID Number

ENVIRITE OF OHIO, INC.
2050 CENTRAL AVENUE, S.E.
CANTON OH 44707

OH0980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. RQ Hazardous waste, solid, n.o.s. (Lead)
9, NA3077, PG III
(D008) ASH 82-6966 ENV#CS4671

001 BT

4,600.00 P

D008

b.

4,486.0

c.

d.

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Printed/Typed Name

RICHARD G. NIELSON

Signature

Richard G. Nielson

Month Day Year

01/07/03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

ROBBIE D. WOOD

Signature

Robbie D. Wood

Month Day Year

01/07/03

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

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If the waste ...,	and/but if..,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Generator's EPA #: SC0170022560

Pick-up Address: PO Box 190010 (CSO)

Manifest Document Number: 13845

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4671	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

Section 6 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: Richard A. Nielson Signature: [Signature] Date: 1/7/03

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name: Signature: Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name: Signature: Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's U.S. EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but is by State law.
	SC01700225610	13846		

3. Generator's Name and Mailing Address SOUTHERN DIV. NAVAL FACILITY PO BOX 190010 C50 N. CHARLESTON SC 29419-9010		4. Generator's Phone (843 740-2780) JED HEAMES (843) 743-2985	
5. Transporter 1 Company Name ROBBIE D. WOOD		6. U.S. EPA ID Number ALD067138891	
7. Transporter 2 Company Name		8. U.S. EPA ID Number	
9. Designated Facility Name and Site Address ENVIRITE OF OHIO, INC. 2050 CENTRAL AVENUE, S.E. CANTON OH 44707		10. U.S. EPA ID Number OH D980568992	

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers		13. Total Quantity	14. Unit Wt/Vol
	No.	Type		
a. RQ Hazardous waste, solid, n.o.s. (Lead) 9, NA3077, PG III (D008) ASH 82-6966 ENV#CS4671	001	DT	46000	P
b.			44100	
c.				

a. <input type="text"/>	c. <input type="text"/>
b. <input type="text"/>	d. <input type="text"/>

15. Special Handling Instructions and Additional Information *EVERY SPILL, RELEASE OR INCIDENT INVOLVING ASHLAND DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR NIGHT TO 1-800-ASHLAND.*	Public reporting burden for this collection of information is estimated to average 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.
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16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name Robert S. Smith	Signature <i>Robert S. Smith</i>	Month Day Year 01 09 03
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17. Transporter 1 Acknowledgement of Receipt of Materials Printed/Typed Name Don R. Roeder	Signature <i>Don R. Roeder</i>	Month Day Year 01 09 03
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18. Transporter 2 Acknowledgement of Receipt of Materials Printed/Typed Name	Signature	Month Day Year
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19. Discrepancy Indication Space	a. <input type="text"/> lbs. c. <input type="text"/> lbs.
	b. <input type="text"/> lbs. d. <input type="text"/> lbs.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19. Printed/Typed Name	Signature	Month Day Year
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LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

The purpose of this document is to provide notification — and if appropriate, certification — relating to the waste referenced herein, as required by the land disposal restrictions codified at 40 CFR Part 268.

Instructions for completing this form: For *each* waste stream referenced on this form, please complete Sections 1 through 5, Section 7, and other sections as applicable. To complete Section 7, please note that only one type of notification (and/or certification) will apply to a waste stream, so please consult the following table for further instructions. Complete Section 6 only if a waste subcategory applies. Complete Section 8 only for characteristic wastes, if required by regulation. Signatures must be provided only by an authorized generator representative.

If the waste ...,	and/or but if,,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

SECTION 1

Generator's Name: Southern Div. Naval Facility Eng. Command Generator's EPA #: SC 0170 022560

Pick-up Address: Po Box 190010 (CSO)

Manifest Document Number: 13846

State Manifest Document Number:

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS4671	D008	NWW		See section <u>9</u>
					See section
					See section
					See section

SECTION 2

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

SECTION 3

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.

Printed Name: x RICHARD A. VANCE Signature: x Richard A. Vance Date: x 1/9/03

SECTION 4

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Printed Name:

Signature:

Date:

SECTION 5

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:

SECTION 6

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed Name:

Signature:

Date:



South Carolina Department of Health and Environmental Control

Bureau of Solid & Hazardous Waste Mgt.
2600 Bull Street, Columbia, SC 29201
Phone: (803) 896-4000
Emergency & Holidays: (803) 253-6488

PLEASE PRINT or TYPE (Form designed for use on elite [12-pitch] typewriter)

Form Approved OMB No. 2050-0039 Expires 9-30-99

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's U.S. EPA ID No.

Manifest
Document No.

2. Page 1
of 1

Information in the shaded areas is not
required by Federal law, but is by State law.

3. Generator's Name and Mailing Address

SOUTHERN DIV. NAVAL FACILITY ENG COM

PO BOX 190010 CSO

N. CHARLESTON SC 29419-9010

RICK NITZSON

(843) 743-2485

4. Generator's Phone (843) 740-2780

JED HEAMES

5. Transporter 1 Company Name

ROBBIE D. WOOD

6. U.S. EPA ID Number

ALD067138891

7. Transporter 2 Company Name

8. U.S. EPA ID Number

9. Designated Facility Name and Site Address

ENVIRITE OF OHIO, INC.

2050 CENTRAL AVENUE, S.E.

CANTON OH 44707

10. U.S. EPA ID Number

OH D 980568992

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers
No. Type

13. Total Quantity

14. Unit
Wt/Vol

a. RQ Hazardous waste, solid, n.o.s. (Lead)

9, NA3077, PG III

(D008) ASH 82-6966 ENV#CS4671

0,01

DT

4,600.00

P

D 0 0 8

b.

c.

15. Special Handling Instructions and Additional Information

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DISTRIBUTION CO. PRODUCTS, MUST BE REPORTED, DAY OR
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the form. Send comments regarding this burden estimate, including
suggestions for reducing this burden, to Chief, Information Policy Branch,
PM-223, U.S. Environmental Protection Agency, 401 M St., S.W.,
Washington, D.C. 20460, and to the Office of Information and Regulatory
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practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human
health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method
that is available to me and that I can afford.

Printed/Typed Name

Amy Daniell

Signature

Amy Daniell

Month Day Year
10 1 09 03

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Ed Webb

Signature

Ed Webb

Month Day Year
10 1 09 03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

a. lbs. c. lbs.

b. lbs. d. lbs.

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

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If the waste ...,	and/but if...,	then also complete section
is F or K code waste,	and it fails LDRs,	9
is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Section 1

Generator's Name: Southern Div. Naval Facility Eng. Support Command Generator's EPA #: SC 0170 022560
 Pick-up Address: PO Box 190010 (CSO)
 Manifest Document Number: 13847 State Manifest Document Number: _____

Manifest Item #	Envirite Approval #	EPA Hazardous Waste Number ("Waste Code")	Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	Subcategory (if applicable)	Type of Notification/Certification (fill in the blank)
11a	CS467	D008	NWW		See section <u>9</u>
					See section _____
					See section _____
					See section _____

Section 2

Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 3

To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.
 Printed Name: Richard G. Nielson Signature: [Signature] Date: 1/9/03

Section 4

I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.
 Printed Name: _____ Signature: _____ Date: _____

Section 5

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
 Printed Name: _____ Signature: _____ Date: _____

Section 6

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
 Printed Name: _____ Signature: _____ Date: _____

20. Facility Owner or Operator; Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.					
Printed/Typed Name		Signature		Month	Day Year

LAND DISPOSAL NOTIFICATION/CERTIFICATION FORM for PROCESS WASTES

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is F or K code waste,	and it meets LDRs,	10
is D code waste,	and it fails LDRs for the hazardous characteristic & UHCs,	9
was D code waste,	and it meets LDRs for the D code, but fails for UHCs,	11
was D code waste,	and it meets LDRs for both the D code and all UHCs,	12

Generator's Name: Southern Div. Naval Facility Eng. Building Generator's EPA #: SC 0170 022560
 Pick-up Address: PO Box 190010 (CSO)
 Manifest Document Number: 13848 State Manifest Document Number:

SECTION 1 Manifest Item #	SECTION 2 Envirite Approval #	SECTION 3 EPA Hazardous Waste Number ("Waste Code")	SECTION 4 Treatability Group: Wastewater (WW) or Nonwastewater (NWW)	SECTION 5 Subcategory (if applicable)	SECTION 6 Type of Notification/Certification (fill in the blank)
11a	CS467	D008	NWW		See section 9
					See section
					See section
					See section

SECTION 8 Underlying Hazardous Constituents (UHCs) (For each waste stream for which they must be identified, please identify all UHCs, or indicate that they are identified in an attachment to this form.)

Section 1 To be land disposed, this waste must meet applicable land disposal restrictions treatment standards in 40 CFR 268 Subpart D.
 Printed Name: Richard G. Noss Signature: [Signature] Date: 4/19/03

Section 2 I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.
 Printed Name: _____ Signature: _____ Date: _____

Section 3 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
 Printed Name: _____ Signature: _____ Date: _____

Section 4 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in § 268.2(i) have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
 Printed Name: _____ Signature: _____ Date: _____



Photo 1 - South Excavation Facing East



Photo 2 - South Excavation Area Around Monitor Well E605GW005



Photo 3 - South Excavation Area With Electrical Conduit and Box



Photo 4 - West End of North Shallow Excavation Area

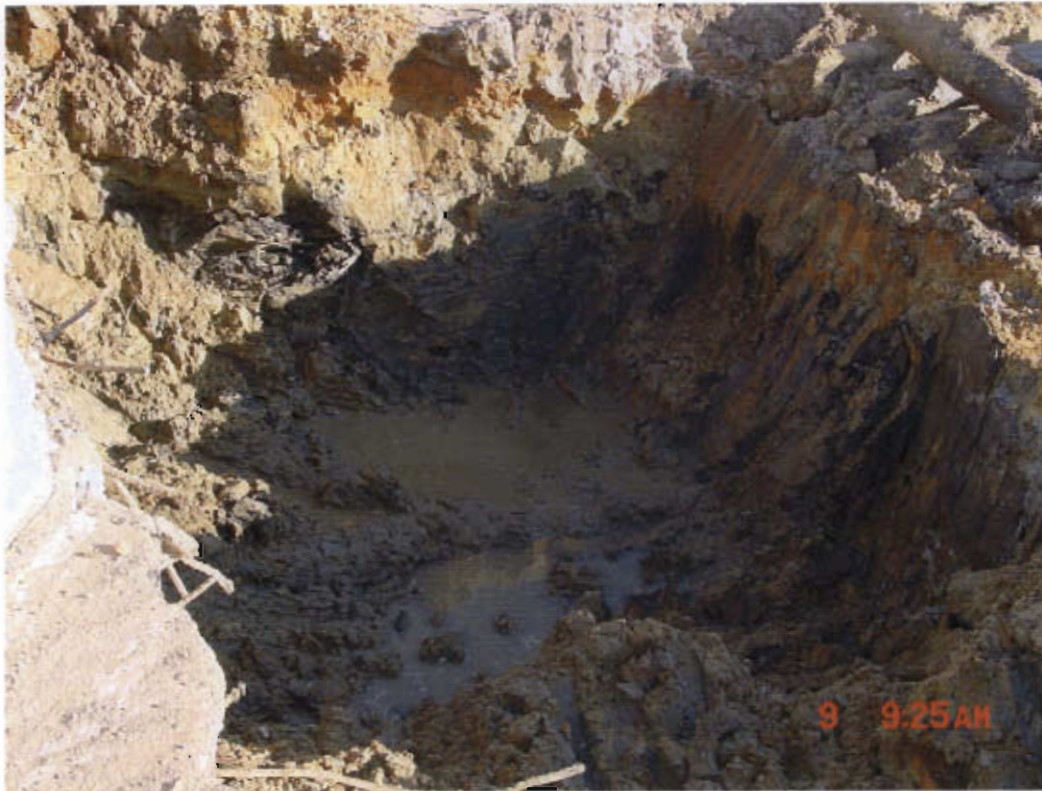


Photo 5 – West Deep Excavation Area



Photo 6 – Loading Soil



Photo 7 – Site Restored, Facing Northwest



Photo 8 – Site Restored, Facing East